

The Milbank Memorial Fund
QUARTERLY

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Vol. XXIX

APRIL, 1951

No. 2

Edited by the Technical Staff

Published quarterly by the MILBANK MEMORIAL FUND, 40 Wall Street,
New York 5, New York. Printed in the U.S.A. Subscription: \$1.00 a year.



IN THIS ISSUE

HEALTH workers in the United States are interested in the organization and problems of European health services. During the summer of 1950, a party of fourteen American professional people undertook a brief but intensive study of health-service organization in England, Sweden, Switzerland, and France.

Dr. Milton I. Roemer, who was a member of the study group, has summarized his observations in the article "Health Service Organization in Western Europe." To make the account significant for the American reader, he has drawn comparisons with American organizational counterparts and concludes with a discussion of broad questions on the quality of medical care in Europe.

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The paper "Food Habits of Native Born and Reared School Children in Two Regions," by Clara A. Storvick, Bernice Schaad, Ruth E. Coffey, and Mary B. Deardorff, is a report of one phase of an investigation made during 1948 of the nutritional status of population groups in two areas of Oregon.

The records of the food intake of boys and girls 14-16 years of age were evaluated for each of eight nutrients: calcium, iron, protein, vitamin A value, ascorbic acid, thiamine, riboflavin, and niacin. The levels of intake were classified as adequate, borderline, or inadequate when compared to the National Research Council recommended dietary allowance. Over 60 per cent of the children had dietaries which were adequate in all of the nutrients except iron and ascorbic acid. Less than 10 per cent had diets which were classified as inadequate in protein, vitamin A value, thiamine, riboflavin, and niacin.

This report should be of interest to persons working in the field of nutrition.

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Surveys of morbidity have shown that about 40 per cent of all illness is due to acute respiratory diseases. Among employed persons illnesses of this type accounted for 42 per cent of the days lost from work because of disease. Because of their importance, careful research is being done in the form of experiments in the control of these illnesses.

It has been presumed that respiratory illness may be an air-borne infection. As a result ultra-violet irradiation as a means of air sterilization has been experimented with in various types of environment.

The article "Control of Acute Respiratory Illness by Ultra-Violet Lights," by Jean Downes, presents the results of the use of ultra-violet lights in the schools of one community in Westchester County compared with a control community where no lights were used. It was found that the use of ultra-violet lights did not modify the level of incidence or the epidemiological pattern of acute respiratory illness in one community as compared with the other.

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The trend toward planned parenthood is sometimes interpreted as part of a supposed wider trend toward planning in general. It is argued that this has come through increasing urbanization and education of the population. Heretofore, however, data have not been available to indicate whether or not couples who plan size of family tend also to be those who plan other aspects of their family life. Some data on this question are presented in this issue as the twelfth in a series of reports on "Social and Psychological Factors Affecting Fertility." This report, by Ronald Freedman and P. K. Whelpton, is entitled "The Relationship of General Planning to Fertility Planning and Fertility Rates."

HEALTH SERVICE ORGANIZATION IN WESTERN EUROPE¹

MILTON I. ROEMER, M.D.²

SO MUCH of America's cultural heritage derives from Europe that it is small wonder that health workers in the United States have been interested in developments there. Social trends in the Old World have so often marked out the paths of change in the New World that a study of the organization and problems of European health services can shed much light on the meaning of events in the United States. It was with this motivation that a party of 14 American professional people³ undertook a brief but intensive study of health service organization in England, Sweden, Switzerland and France, during the summer of 1950.

Although the schedule allowed only about seven days in each country, practically every morning, afternoon, and evening were scheduled with visits to ministries of health, medical associations, hospitals, health departments, private physician's and dentist's offices, special clinics, nurseries, medical and nursing schools, agencies of social security, voluntary health societies, international organizations, or ordinary people in every walk of life. Fortified by the rich body of literature on European medicine, it was possible to get a picture of the general framework of health services in the nations visited and to draw certain comparisons with conditions in the United States.

EUROPE'S SOCIAL BACKGROUND

A few simple, basic facts about Europe have tremendous im-

¹ This report is based principally on observations during a survey in August-September 1950, sponsored by World Study Tours (Columbia University Travel Service).

² Yale University, Department of Public Health.

³ The party consisted of four physicians (a general practitioner, a specialist, a full-time public health administrator, and a teacher of public health), two private dentists, a nursing supervisor in a mental hospital, a podiatrist, two general social workers, a medical social worker, a research worker from an insurance company, and two medical economists from the Federal Government (the Social Security Administration and the Bureau of the Budget).

pact on health service organization. Some of these are so obvious to the American visitor that their great importance may be overlooked.

First, relative to the United States, Europe is old. The organization of society toward the solution of individual problems has proceeded for centuries; collective efforts have grown more extensively than here in every field. Leaving aside the full-blown communism of Eastern Europe, the economies of Western Europe have become increasingly socialized. In Great Britain there is the vast domestic program of the Labor Party, involving national ownership and operation of transportation, public utilities, coal mining, and now the basic steel industry. In Sweden, co-operatives have been a basic feature of the economy—in both the production and consumption of goods—for over a century. In Switzerland, co-operatives have also figured prominently and the all-important transportation system is nationalized. In both these countries, co-operative non-profit enterprises are fostered and subsidized by government. In France, the individualistic tradition runs deeper, but there is still a system of Social Security far more sweeping than ours.

Second, relative to the economy of the United States, Europe is poor. Its natural resources in land, metals, timber, chemicals, coal, oil, and (except for Soviet Russia) manpower are much smaller than ours. For centuries most of its nations have depended on the exploitation of "underdeveloped" areas of the earth, and colonial empires have been fading away. National rivalries have long stifled the development of free trade, and currently the East-West political conflict has added new barriers to the exchange of raw materials and manufactured products. European cities, industries, homes, and people have been devastated by two World Wars in a generation, not to mention the centuries of lesser wars before these. By comparison the wastage and destruction of American resources caused by wars have been trivial.

Third, relative to the United States, Europe is small. Millions live in areas which on this side of the Atlantic contain only

thousands. While there are sharp differences in nationalities and national traits, people are thrown together. A few hours' travel brings one into another nation and another culture. As a result, there is an extremely active exchange of ideas. People love to talk; the "strong, silent type" is not so popular. Arguments are not regarded as impolite, but as stimulating; yet there is great courtesy and it seems genuine. In this setting, although the force of tradition is great, new ideas grow rapidly—ideas in art, science, philosophy, and politics.

Fourth, relative to the United States, Europe has suffered. In recent years, virtually every family has been struck by tragedy. The suffering has been so deep and has affected so many millions of people that there is a demand for security far greater than in the United States. Europeans look for compensations to their sufferings and their discomforts through art, music, literature, travel, wine, good conversation. But they also seek various forms of assurance of economic security, through collective action. It is this search that leads Europeans now to various social programs, including measures for medical care. The suffering of Europeans has made them politically mature; the percentage of the population voting in elections is far higher than anywhere in the United States. The average citizen is sensitive to political issues, reflecting as they do social problems and collective ways of meeting them.

It is against this social background of Europe's relative age, its small size, its poverty, and its suffering that one must view and evaluate the structure and trends of health service organization. Observers who evaluate European medicine on the basis of bland comparisons with American medicine give conclusions no more scientifically accurate than an evaluation of the attributes of two plants without regard to the climate and soil in which they grew.

ECONOMIC SUPPORT FOR MEDICAL SERVICES

Throughout Great Britain, Sweden, Switzerland, and France, the economic support for medical and related services has become predominantly (though not entirely) socialized. The

term "socialized" is used in its broad sense to mean: organized by group action, whether governmental or voluntary. It encompasses governmentally controlled financing whether by the device of social insurance or general taxation. Historically considered, these various forms of group financing—that is: voluntary insurance, compulsory insurance, and general revenue support—vary only in degree, each representing collective rather than individual economic arrangements, and one form leading frequently into the other. Only a minority fraction of total medical care costs remain to be borne through personal, individual responsibility in Western Europe.

Yet, there are great differences in the approach to the social support of medical care costs. Great Britain, after a limited program of social insurance from 1911 to 1948 (financing general practitioner services for employed workers), has now gone farthest in socialized financing—almost as far as Soviet Russia and the countries of Eastern Europe. Virtually all medical services for the entire population are financed collectively; about 90 per cent through general revenues and 10 per cent through social insurance. In Sweden and in Switzerland, there are combinations of widespread voluntary insurance financing through local plans and general revenue support, somewhat along the lines of recent legislative proposals in the United States. In France there is a combination of national compulsory insurance and general revenue support.

Important distinctions must be made in the description of the financial support for hospital services, as against ambulatory medical care. The proportion of general revenue support for the former tends to be much greater than for the latter. As will be seen, the entire sphere of hospital services, including both the financing and the pattern of organization of professional services, has been subjected to much more social control than have the services of physicians in the home or office. Ambulatory care is associated more with the individual entrepreneur and contributory insurance financing.

The line between governmental and voluntary group action

is much less sharp in Europe than in the United States. In Sweden and Switzerland, for example, the insurance plans for physician's care are voluntary. The plans are organized on an area basis, rather than by occupation or industry, and administration is in local non-governmental hands. But these plans are heavily subsidized by government, in Sweden by the national government and in Switzerland by the canton or state governments. In Sweden, the premiums for membership in voluntary "sickness funds" are fixed (not varying with the subscriber's income), but about 50 per cent of the total costs of benefits is supported by government grants; this allows premiums to be quite low, offering little impediment to the enrollment of low-income persons. As a condition for receiving these grants, the plans are closely supervised by the government with respect to their rules of eligibility, extent of benefits, administrative procedures and so on.

The voluntary insurance plans give substantial but not complete protection against the cost of medical care. In Sweden they encompass only about 70 per cent of the population and in Switzerland about the same. There are various restrictions to membership, similar to those of voluntary plans in this country; the Stockholm plan, for instance, excludes initial enrollment of persons over 50 years of age and denies benefits for the care of pre-existing conditions. The full cost of physician's care, moreover, is not provided. In Sweden and Switzerland, the plans indemnify the beneficiary for two-thirds or three-quarters of the doctor's fees (for home and office service) according to government-approved fee schedules. Even in France, where the insurance is compulsory and nation-wide for all employed workers, the Social Security fund reimburses the worker for about 80 per cent of medical and hospital fees; in practice, it often amounts to less than this since doctors are permitted to charge fees in excess of the established schedules. Requirement of these partial payments by the patient is designed to discourage abuses, but it may discourage the procurement of needed services by low-income families. Only in

Great Britain is there complete freedom from financial impediments to medical care.

It is especially interesting to American observers to discover that voluntary insurance plan directors in Sweden have no objection to a system of compulsory enrollment. They would actually prefer it, believing that only in this way could protection be given to the entire population. Many healthy young people—good insurance risks—now fail to join plans, thereby compelling restrictions on “bad risk” persons for actuarial reasons. Compulsory enrollment requirements would not drive the voluntary plans out of business, but would give them a larger job to do, as was the case in the earliest compulsory health insurance program in Germany (since 1883) and in England from 1911 to 1948.

The present coverage of the Social Security program in France is a great extension over the pre-war program, covering the entire employed population in the cities and their dependents. A separate comprehensive health insurance program covers agricultural workers, but all self-employed persons must depend on voluntary insurance. Since the war, Sweden too has passed a law which would encompass not only employed workers but the entire population under a compulsory health insurance scheme. The law was to have been effective in July, 1950, was postponed to July, 1951, but now has been further postponed indefinitely. The law would levy a small fixed insurance tax on all persons, regardless of income, but most of the cost would be borne by general revenues. It is now felt that the cost would be excessive and the nation cannot “afford it.” Is this attitude related to the fact that Sweden did not take part in the Second World War and that its people did not suffer? Great Britain also knew that its National Health Service would be expensive—and it proved even costlier than anticipated; yet the money has been appropriated without any significant opposition. The British people had suffered greatly and the demand for health security was enormous—enough to justify, in British opinion, the extremely high taxes involved.

HOSPITALIZATION AND AMBULATORY CARE

The social organization of hospital services in Europe has proceeded along very different lines from that in America. In the United States, the general hospital has been in the main an extension of the private practice of medicine. It has been regarded largely as the "doctor's workshop" where the physician takes his private patients who are seriously sick. In the average American community, the great majority of doctors have "hospital privileges." This has been undergoing gradual change here, with the crystallization of the specialties and tightening of hospital staff organization, the extension of governmental institutions, the development of great teaching centers and regional hospital plans, and so on. In most towns, however, the general hospital is still a part of the world of private medical practice.

In Europe, from the beginning hospitals have been predominantly public institutions. In Sweden and in Switzerland, nearly all hospital beds are in institutions owned, operated and largely financed by units of government, usually local authorities. In France, while there are many voluntary institutions, most of the general hospital beds are in public facilities. Moreover, the voluntary hospitals have operated very much the way public hospitals do here, the great majority of their patients getting "ward care" paid for by combinations of insurance, general revenue, and charity. In England, long before the National Health Service Act, the proportion of general beds in governmental hospitals exceeded that in voluntary institutions and was continuing to rise; the pattern of care in voluntary hospitals was like that in France. Since July, 1948, virtually all British hospitals have come under complete governmental control. Being costly, general hospital services in Europe have been largely assumed as a public responsibility, like grade school education or, indeed, hospital care for tuberculosis and mental disorder in the United States.

With the overwhelmingly public character of European hospitals, medical staff organization is naturally quite different

from that in America. In Great Britain and Sweden, nearly all medical and surgical services in the hospitals are rendered by organized staffs of salaried specialists. This is hard for many American physicians to believe, so closely is the hospital tied to private fee-for-service medicine in our country. In France and Switzerland this is not the general rule, although a growing proportion of in-patient care in the governmental general hospitals is performed by salaried men. When professional services in the hospital are rendered by private specialists in France or Switzerland, the patient seldom pays a private surgical or medical fee. A general payment is made to the hospital—usually from the insurance system—and the physician is paid a relatively small annual honorarium (part-time salary). Only a small percentage of physicians have any direct access to the hospitals, either governmental or voluntary. The patient is cared for by the physician who is "on service" at the time, as in the average ward service in the United States.

The sharp separation of general practitioners, constituting the majority of physicians, from the hospitals is a source of dismay to many American observers. The "closed staff" is far more tightly closed than here. From the viewpoint of maintaining a high level of medical performance in the general practitioner, his isolation from the stimulating influences of the hospital is surely unfortunate. But there is a good side to it: the level of professional work in the hospitals is high. As a rule only well qualified specialists render service and there is assurance that the patient is getting expert care. Patients do not seem to object to the loss of free choice of doctor that hospitalization and care by a specialist usually means. A small proportion of people, perhaps less than 5 per cent, insist on free choice of specialist and can pay the private fees for care rendered, usually in a "nursing home," outside the public medical system or the insurance system. Most important, the European patient seldom if ever has to avoid needed hospitalization because of the institutional and professional costs involved.

In Sweden, the public hospital system is particularly well

developed. Less tied to tradition than England or the continent, Sweden has erected some of the most magnificently functional hospital structures in the world. About 90 per cent of the cost of service is borne by the tax funds of the Swedish cities or counties, and only 10 per cent by the patient. This 10 per cent charge, moreover, is usually paid for the patient by his voluntary insurance society or, if he is indigent, by a welfare agency. Yet, in the new Swedish hospitals one does not see huge wards with impersonal management of cases. In the great South Hospital, Stockholm's newest, the largest wards contain four beds and there are many rooms with only one and two beds. The choice of a room is not made by the patient, in proportion to his affluence, but by the doctor, on the basis of the medical needs of the case. All services are rendered by salaried specialists and an active research program is conducted. These policies symbolize the general trend of hospital services in Europe.

Despite this high degree of organization of hospital services, physicians' home and office care in Europe is rendered predominantly along individualistic lines. While the insurance systems have organized economic support collectively, the pattern of care for ambulatory patients is based on private office practice. Polyclinics attached to hospitals are busy because patients can get specialist services in them without paying the charges left uncovered by insurance benefits (since indemnification is 80 per cent or less in France, Switzerland, and Sweden). The great bulk of care for ambulatory illness, however, is rendered by family doctors who receive private fees for each unit of service. In Great Britain, general practitioners are paid on a capitation basis and practice in private offices, even though financial support is almost entirely from general revenues.

PUBLIC HEALTH ADMINISTRATION

Administratively, the organized programs of medical care—both hospital and ambulatory—are quite separate and distinct from public health activities. The governmental or voluntary

agencies responsible for supervision of the medical care or social insurance programs are different from those providing preventive health services. Theoretically, this seems unfortunate, but it follows from the separate historical origins of the two movements. Medical care insurance programs grew from the experience and demands of the labor movement; social security was a response to the insecurity of the industrial worker dependent on wages and faced always with the hazard of unemployment. Hospitals sprang from the public welfare movement, an outgrowth of monasteries and almshouses for the care of the sick poor; they were part of the charitable tradition of Christianity to help the unfortunate. Public health, on the other hand, had foundations in general community development, as urbanization created problems of crowding and spread of communicable disease. It was not tied so closely to the labor movement or to charitable efforts for the poor. While the early public health thinking, prior to about 1870, was motivated by efforts to improve the lot of the lower economic classes (Frank in Italy, Chadwick in England, Pettenkofer in Germany)—including improvement of housing and working conditions—after the rise of bacteriology, it acquired more technical foundations in engineering, immunology, statistics, and legal restraints.

As a result, it is not surprising that public health services, hospital services and health insurance should have generally distinct administrative frameworks. This is unfortunate because certain opportunities are lost for preventive medicine. The insurance programs have become largely fiscal operations, with few active measures to prevent disease, and the hospitals likewise do little in way of case-finding (tuberculosis, venereal disease), health education, or other preventive services. Yet, despite the administrative dichotomy, the basically preventive value of any medical care program should not be overlooked. The elimination of economic barriers to early medical attention has great preventive value, especially in the control of chronic illness. Considering the overwhelming importance of the

chronic, degenerative diseases, compared with the acute infections, programs providing easy access to medical and hospital care in Europe, as well as in America, have perhaps greater preventive value than anything else within present knowledge.

A partial exception to the dichotomy of public health and medical care administration is found in Great Britain, where at the national level all health services are centralized in the Ministry of Health. The unity virtually stops here, however, for at the local level throughout Britain, the administration of medical care and public health under the National Health Service is divided among four separate agencies. Public health services are administered by the local Medical Officers of Health, as prior to the National Health Service Act; general medical and dental practitioner services are administered by newly organized local Executive Councils; hospitals and specialist services are under Regional Hospital Boards; and the large teaching hospitals (associated with medical schools) have a separate administrative framework. While the local Medical Officer of Health makes some effort to coordinate services, it is obviously difficult under such separations of authority. Critics of the unwieldy character of the National Health Service organization sometimes overlook the fact that this divided system was not the wish of the government and especially not that of the Ministry of Health. It was set up in this way to satisfy the demands of special professional groups: the general practitioners of medicine and dentistry, the specialists, and the medical educators. Compromise yielded complexity in administration and correction of the problems would require a more radical, rather than a more conservative approach.

In Sweden, while public health and health insurance programs are administered by separate agencies, there is some integration of preventive and treatment services at the point of delivery of clinical care in rural areas. The great problem of attracting doctors to the rural stretches of Sweden has been tackled through a system of rural medical officers. These physicians are paid a governmental salary for providing public

health services—such as immunizations, school health examinations, operation of well-baby clinics, attendance of communicable disease cases, etc.—and for treating the poor. They may also engage in private and insurance practice. One of these rural medical officers is available for about every 3,000 to 5,000 people. While this seems like a poor ratio in terms of American standards, the effectiveness of the Swedish physician is extended greatly by three circumstances: (1) an excellent system of public health nurses (about 1 per 2,500 people—far more than we have in the United States nationally) for home visiting and auxiliary medical services; (2) a much greater supply of hospital beds, both rural and urban, than in America, saving the doctor considerable travel time; (3) coverage of larger population units of about 75,000 with full-time “county” public health officers for sanitary, administrative, organizational, and educational duties.

To risk a large generalization, public health activities in Europe seem to be deeper than in the United States, though not so broad. The public health agencies do fewer things, but they do them more completely. English and French well-baby clinics, for example, are said to reach 80 per cent of the infants born in their areas. In the United States, an excellent program may reach 20 per cent of the babies, the rest being seen by private physicians or getting no systematic attention at all. The same sort of general comparison applies to tuberculosis and venereal disease control activities. On the other hand, the variety of programs promoted in the United States, at least in the better developed public health jurisdictions, is not found in Europe. In the four countries visited, the public health agencies do little in health education, mental hygiene, industrial hygiene, and chronic disease control (cancer, heart disease, or diabetes detection); mass case-finding surveys of all kinds are not so common as here. The reason may be that these personal health services are regarded as within the scope of clinical medicine, already more or less available through health insurance. In the United States, there is much evidence that the broad

interests of public health agencies in new fields—especially the chronic diseases—are partly a result of pressures for organized medical care programs not being adequately met in other ways.

The thoroughness of much public health activity in Europe is due in part to a stronger "police power" tradition than characterizes American health work. Nontreatment of venereal disease for example, is usually a crime, punishable by imprisonment. In England, school health services are provided for every school child in the land, since every school authority is compelled by national law to provide such services. Mandatory legislation of this type, even on a state-wide basis, is unknown in the United States. Because of the same legal tradition, the whole field of housing sanitation is far better developed as a public health function in Europe. Health departments in Great Britain, Sweden, and France inspect rented dwellings and can prosecute violations. On the other hand, public sanitation functions, like supervision of the water supply or the pasteurization of milk, are not so well developed on the Continent as in America. In France, one cannot be sure whether the water and milk supplies get inadequate protection because of the engineering costs involved or because of the terrific importance of a third beverage; even Coca-Cola was sacrificed for the welfare of the wine industry.

The administration of public health in France is strangely divided between two official agencies in each community: the Public Office of Social Hygiene and the Office of Public Health. The former agency conducts personal health service programs like venereal disease control, tuberculosis control, and maternal and child health work. The latter handles environmental sanitation, statistics, laboratory services, quarantine, and medico-legal work. At the Ministry level these are united, but in the local communities they are separate because of their historic origins. While this may seem peculiar to Americans, it is perhaps no more bizarre than the dispersion of administrative responsibility for health services among scores of governmental

and voluntary agencies in this country. In one West Virginia county the writer found 155 separate agencies, governmental and voluntary, to be involved in organized health services for either the prevention or treatment of disease. In Europe, the frequent practice of governmental subsidy and partial supervision of voluntary agencies—for example in tuberculosis and child health work—assures teamwork between private and public action.

PROFESSIONAL EDUCATION

Medical education is quite different in Europe from that in the United States. To understand the differences, one should trace the doctor's training from its childhood beginnings in the primary grades, for the content of primary and secondary schooling in Europe differs appreciably from that in America. While it varies in different countries, it is generally believed that by the completion of high school (12th school year), the European student has had training equivalent to the first two years of college in this country. Then, following secondary school, medicine usually requires one continuous program for six or seven years, rather than four years of college followed by four years of medical school. One of the striking differences within this system is that clinical work usually starts earlier; almost from the beginning the student sees patients. This may have the effect of integrating theory and practice more successfully than is often the case here. The European student may see his patient more "as a whole" than does the American student who meets his patient only after years of pure theory in the lecture hall and laboratory, and then quite naturally views him merely as an example of some pathological process.

With this approach in medical education, it is not surprising that the role of the teaching hospitals is relatively even greater than here. Most of the teaching throughout the six years is done at the hospitals and one University, like the University of London or the University of Paris, may contain several medical schools, each associated with a separate hospital. As a result of

his training, the English, French, Swedish, or Swiss physician may be more empirical in his practice, less well grounded in solid scientific theory. In France, this is complicated further by the fact that a majority of graduates do not have a period of post-graduate hospital training, equivalent to our internships and residencies.

Despite the great development of social services in Europe, the teaching of public health and preventive medicine seems to be less well developed than even in American medical schools. Little formal instruction is given in public health, which is regarded chiefly as a post-graduate subject to be studied in one of the schools of hygiene. It may be that the physician is expected to learn public health medicine from experience, as soon as he is in practice. Likewise little or no instruction is given to the undergraduate in the theory or operation of health insurance programs, perhaps because this represents elementary "civics" taught in secondary schools and experienced in everyday life. The teaching of "social medicine" consists, mainly of instruction on the effects of poverty, poor housing, heredity, malnutrition, etc. in the epidemiology of specific diseases, rather than discussion of organized programs of medical care. In the graduate schools of hygiene or public health, American observers are surprised to find almost exclusively physicians, and virtually none of the nurses, engineers, health educators, statisticians, and others who constitute a major portion of the enrollment in American schools of public health.

Throughout Europe, and especially in Great Britain, the midwife has a respectable and integral place in medical service. A large portion of deliveries in the home have long been performed by women trained in midwifery and doing a good quality of work. Physicians are called for difficult cases, but the availability of the midwife for the normal obstetrical case has helped to compensate for Europe's relative shortage of physicians. With increasing hospitalization of maternity cases, the role of the midwife has waned. The arm of the physician is extended also by nurses, who perform a wider range of medical tasks in

the hospital and in the patient's home than is conventionally permitted in the United States. In Sweden, it is commonplace for nurses to discuss the management of cases with physicians, and Swedish nurses visiting American hospitals are surprised at the subordinate role of their American counterparts. In France, the emphasis on psychological and sociological viewpoints in the training of the nurse is heartening. Nurses going into public health work receive training equivalent to one year of social work and all French social workers receive the equivalent of one year's training in nursing.

THE QUALITY OF MEDICAL SERVICE IN EUROPE

The previous discussion, while far from an adequate account of health service organization in Great Britain, Sweden, Switzerland, and France, may help to provide a background for evaluation of European medical care compared with American. It is very often said that the quality of medicine deteriorates under governmental medical care programs—whether insurance or tax supported—and the evidence often offered is that “medicine in Europe has gone downhill.” This is a serious and damaging charge, but it is difficult to find corroboration of it among responsible bodies of European physicians. Individual European practitioners have broadcast unfavorable descriptions of perfunctory work done in the office of a doctor working under compulsory insurance legislation, but the professional societies, the academies, and the teaching centers do not confirm these accounts as a fair picture of general conditions.

While European medicine, on the average, has probably not deteriorated, it cannot be denied that it has failed to advance as rapidly as has American medicine. Europe, once the world center of medical science, has given way to the United States; American medicine, once weak, has in many respects come to surpass European medicine in technical excellence. The meaning of such comparisons, however, is deceptive. How much are these evaluations influenced by the quality of work done in the great teaching centers of the two continents and how much by

a sober evaluation of the level and scope of service available to the average citizen, rich, poor and in-between?

Much of America's technical superiority is due to our research programs. We are doing more research in almost all fields of medicine and public health than is any European country. Research costs money and we have more to spend. Great fortunes have been accumulated in the United States, yielding large philanthropic research endowments; industrial profits have made possible huge research programs under commercial auspices; government has increasingly subsidized research with tax funds. We have not been impoverished by the ravages of two World Wars. Yet we must be humble when we realize that even in recent years—let alone in past decades—some of the most important discoveries in medicine and public health have come from Europe: sulfanilamide from Germany, penicillin from England, and DDT from Switzerland.

If we attempt to focus, nevertheless, on the quality of medical service available to the average European, what can be said? There are undoubtedly many real problems; most of them relate to the conditions of general office practice, rather than hospital service. The insurance programs have enabled large numbers of people to have access to a doctor's office, but what happens to them when they enter the door? Keeping always in mind that a smaller proportion of Americans enter the doctor's office at all, those that do are likely to receive a better medical examination than does the average European. X-ray and laboratory work is less likely to be done for the European. Most, though not all, doctors are pressed for time. A quick prescription may be handed out in order to make room for the next patient. The doctor may lack interest in keeping informed on the latest scientific developments and may send his patient off to the hospital if a problem of the slightest complexity arises.

These criticisms of European medicine are frequently made by American observers. The same applies, however, to much general medical practice in the United States, especially for the 60,000,000 people living in rural areas and for the millions more

living in the crowded slums of our big cities. These problems are substantially the result of a high demand for service relative to the medical manpower available. Whenever the effective demand for service exceeds the supply of medical time, perfunctory care may result. The situation is complicated further by the sharp separation between the office and hospital practice of medicine. But are these problems a result of the insurance and public medical care programs in Europe?

SHORTAGE OF MEDICAL PERSONNEL

To gain an understanding of the qualitative problems of European medicine, it is necessary to view it against its total economic and historical setting. Why is there a relatively insufficient supply of doctors in Europe? The supply of doctors in a nation basically is economically determined. A nation can support only a certain number of physicians with the money it has to spend on physician's care, relative to other needs of daily living. If the number of doctors is increased beyond the economic capacity to support them, doctors will not survive and men and women will not undertake the study of medicine. China and India can only support one doctor to 50,000 people or more; France about one to 2,000; England about one to 1,200; the United States about one to 750. Other important factors enter, like the adequacy of professional schools and limitations that may be placed on acceptance of candidates for training, but the most fundamental determinant of the supply of medical personnel in a nation is its national income and the share of it available for medical service.

The systems of health insurance, rather than decreasing the supply of doctors relative to population, have stimulated a steady increase in the relative supply since the 1880's, when the first governmental programs were enacted. In the United States, the relative supply of physicians has actually declined in the same period. Health insurance and public medical care programs have reserved larger shares of the national income for health services and made possible great expansion of the

supply of both doctors and hospital beds. At the same time, the reduction of economic barriers for the consumer has obviously increased the effective demand for medical service. The question then becomes: has the increase in the supply of personnel kept pace with the increased demand for service? Idealistically considered, the answer is probably "no." The difficulty is that the insurance systems have not spent enough money, for there are still not enough doctors. Expenditures within the insurance and tax-supported medical services have risen steadily—with the expanding demands for medical service and the increasing complexities of medical technology. But there is a limit to the expenditures a nation can support for medical care, just as there are limits to the reasonable expenditures of a nation for houses, bathrooms, or four-lane highways.

These rising costs of governmental medical care programs have, indeed, been attacked by American critics as evidence of the "extravagance" of compulsory health insurance. It is difficult to reconcile this viewpoint with the fact that greater expenditures make possible an expansion of personnel and facilities. The problems have been created not by the abundant expenditures of the programs, but by their frugality. Despite the rising expenditures, European economies still seem to put less money proportionately into medical care than does America. The total cost of the British National Health Service—even after the large increase in costs beyond the initial estimates—amounts to less than 4 per cent of Britain's national income, while expenditures in the United States are estimated at over 4 per cent of our income.

Fundamentally, the insurance and related programs have helped to ameliorate the difficulties in European medical service caused by economic facts, rather than having produced these difficulties. Striking evidence of this is the fact that the British, French, Swedish, and Swiss Medical Associations have not advocated the abolition of the insurance programs, but rather their expansion to cover larger proportions of the population and wider scopes of service. The British medical profession

remembers the "two-penny doctor" in the large cities before the first National Health Insurance Act of 1911 who, to make a scant living among his poverty-stricken clientele, had to charge ridiculously low fees. The insurance programs brought a better assured income for him, just as they did for doctors throughout Europe and just as Blue Cross plans in the United States, for example, have helped the hospitals financially. Not that physicians have been satisfied with the fees they receive under insurance programs. In France, today, there are bitter complaints about the government fee schedules and the British Medical Association has been battling hard for higher capitation payments to general practitioners. But these complaints are within a framework of acceptance of the total medical care program and they mean that more insurance is wanted, rather than less. To satisfy them would require adjustments in the remuneration of other classes of personnel or facilities (such as the dentists who have been earning disproportionately high incomes under the British program) or the reduction of other expenditures in the total economy to reserve more funds for medical care.

If elevation of fee payments would cause a greater aggregate national expenditure for medical care, it is obvious that increases in the over-all supply of physicians would do likewise, or else average physician's earnings would decline. The persistent question remains how large a sum a nation can reserve from its national income for medical expenses, in relation to housing, food, clothing, and other essentials? One may then ask: "Why institute programs of compulsory health insurance or public medical service if a nation cannot afford to support adequate numbers of personnel and facilities to meet the demands for service?"

The answer must be found in the general social facts about Europe epitomized in its age, smallness, poverty, and suffering. These conditions have given rise to a strong demand for social improvement. The attitude of the governments elected to power has become: *we may not have enough resources, but*

what we have will be more or less evenly divided among us. This has undoubtedly resulted in a situation—seen most sharply in England—in which a small percentage of persons of relatively high income cannot obtain as much medical service as they could when they paid for it privately, simply because the doctor has more demands on his time. But there can be no doubt that, under the governmental programs, the far larger number of persons who are of low or moderate income receive more medical care than they could possibly have afforded privately.

PATTERNS OF MEDICAL PRACTICE

Aside from the inadequacy of personnel, the relationship—or lack of it—between general medical practice and hospital services creates serious problems for the quality of European medicine. Is the isolation of the general practitioner, however, a consequence of the governmental insurance programs? The fact is that the independent development of hospitals, and specialist services within them, long antedates the insurance programs. It relates to the historic origin of hospitals as places for the sick poor. Sweden has operated public hospitals since about 1790 and Paris' Hotel Dieu or London's Guy's Hospital were established long before this. As both public and voluntary hospitals came to serve the great majority of the population at the expense of taxes or charity, the system of full-time salaried specialists attached to the institutions developed in the interests of both economy and efficiency. Even when the hospital specialists were not full-time, as in France, their services were seldom remunerated on a private fee basis. The opportunity for the average physician to use the hospital as an extension of private office practice, with private fees, was rare. (A separate system of "nursing homes," of small aggregate capacity, developed to serve this purpose for the small class of high income patients.) This economic foundation of the American doctor's "hospital connection" lacking, it is natural that general office practice should have become increasingly isolated from hospital medicine.

If anything, the European insurance programs have probably strengthened office practice by making private physicians accessible to patients who might formerly have gone to the free outpatient hospital clinics. Moreover, the ready access of the general practitioner's patients to hospital service is, after all, a tremendous help to both doctor and patient. It is conventional for the hospital to send the general practitioner a full report on his patient, helping to provide some continuity of care. Nevertheless, the stimulating professional influences of hospital affiliation are not available to most European physicians. This is an organizational challenge yet to be faced; the same problem, in reverse, is being faced in the United States, with general practitioners increasingly losing hospital connections which they once enjoyed.

Even within the limited supply of doctors in Europe, a better quality of service might be possible if certain organizational changes were made. Such changes, however, would make European medicine more socialized rather than less. Thus, while many physicians are over-worked and give perfunctory care, others are not working to capacity, exactly as under private practice in the United States. This is not necessarily a reflection of competence but may be related, as in America, to length of time in practice, location, social connections, "bedside manner," or professional competition. As long as free choice, private office practice is the rule, as it is throughout Western Europe, these disparities will probably continue. Only a completely salaried medical service could make full utilization of all available medical manpower, on a rational basis. Despite the acceptance of this pattern for most hospital service, it is generally opposed by the physicians for office practice.

It is proposed in England that the quality of general medical practice will be elevated by the eventual construction of health centers, in which groups of general practitioners will work together, aided by auxiliary personnel and diagnostic equipment. This is, of course, different from the American conception of group practice, involving a team of general physicians and num-

erous specialists. With specialism tied to the hospitals, it is natural that the American type of private medical group for ambulatory patients should be very rare in Europe. The British plan, nevertheless, would correct much of the unhealthy isolation and individualism of solo office practice; it would also promote closer organizational connection between general practitioners and hospitals, since health centers would be professionally related to hospitals in a regional scheme. For the present, the construction of health centers is delayed by the requirements of general public housing and military mobilization.

The quality of office medical practice might also be improved by fuller utilization of auxiliary personnel to conserve the doctor's time for essential duties. This could be most economically done in group medical clinics; in solo practice it would be feasible on a large scale only if larger aggregate payments were made to doctors to enable them to support auxiliary workers. In Great Britain, almost 50 per cent of patients coming to doctors' offices are not seeking direct medical service, but rather disability certifications, permits for certain rationed products, etc. These professional services are essential for other important programs, but their performance could be greatly expedited through a screening of cases by auxiliary health personnel. The same applies to the general record keeping and reports necessary to systematic medical service. It should be added that the volume of "paper work" in the British National Health Service, itself, is small. No reports to the government are required on diagnosis, treatment, fees, volume of service, or other details of medical care; only referrals for specialist service, prescriptions of drugs, disability certifications, and the like call for written forms, exactly as are required in the usual American practice. In Sweden, Switzerland, and France, where payments to physicians are on a fee-for-service basis, vouchers must be filled out for reimbursement—equivalent to private physicians' bills here—but even these tasks could be simplified by clerical assistance.

Systematic post-graduate education of physicians would be another entree to an elevation of the quality of service which

warrants further development in Europe. The use of standard drug formularies would be an additional device, consistent with practices in the finest medical centers. These and other measures, which might elevate the quality of service, would be steps toward greater rather than lesser organization of the European medical professions. Western Europe has more and more organized the financing of medical care by the population, without a commensurate organization of the pattern of providing services. In the hospitals, where the latter has been carried much farther, the quality of service is high and, except for the shortage of beds, the problems are few. Yet, it is significant that the organized medical professions in various nations have few complaints about the place of physicians in the hospitals. Salaried positions on hospital staffs are eagerly sought and there are far more candidates than openings. The complaints of European physicians relate almost entirely to the rates of remuneration for office practice and the heavy demands on the time of successful general practitioners, problems already discussed.

SOCIAL TRENDS

Today in Europe we are seeing great social movements. Consider the significance of the British income tax of 99 per cent on earnings over 5,000 pounds (\$14,000) per year; castles and estates everywhere are being converted to rest-homes and parks. Consider the French Social Security levies of 35 per cent on wages and salaries (29 per cent paid by the employer and 6 per cent by the worker), used mainly for an elaborate system of family allowances which yield, in effect, higher wages to persons with more dependents. Increasing classes of industry are being nationalized, prices are controlled, scarce goods are rationed equitably, social services of all types are being extended. Whether or not these changes will lead gradually to complete socialism, as the British Labor Party envisages, remains to be seen. Difficulties in international relations still complicate internal social policies. Nevertheless, democratizing social change is the order of the day; there is little talk

of war and much talk of constructive planning, such as that which characterized the American scene at the height of the New Deal in the 1930's.

The organization of health services is only one part of this movement, but it is a very important part because medical care is so intimate a need of everyone. In health services, the social movement takes the form of spreading the available services to all people in such a way that, while the supply of personnel and facilities is limited, the criterion for priority becomes not the extent of purchasing power but the extent of medical need. The transition is obviously difficult for the doctor, compelling him often to work much harder for only a slight increase in financial reward. But the people everywhere have demanded it. It will be recalled that one of the few things in the Labor Party program in Great Britain not attacked by the Conservative Party was the National Health Service. The same multi-partisan unity toward health service organization has characterized the other nations of Europe.

Ultimate evaluation of the impact of the European medical care programs on the quality of service depends on how "quality" is defined. What happens to the quality of service for 1,000 persons when all of them are provided some essential care, compared with a situation in which 100 receive a "luxury" volume of care, 400 receive a moderate volume of care and 500 receive hardly any at all? Considering all 1,000 persons, does the quality of service go down or up; can quality be separated from quantity? This is perhaps a somewhat oversimplified formulation, but it symbolizes the nature of the developments in European medicine and the difference between European and American conditions.

There can be no doubt that Great Britain, Sweden, Switzerland, and France are proceeding toward a time when medical services will be a right rather than a privilege for everyone. There remain serious problems complicating the attainment of this goal, but at rock bottom these problems are mainly economic and historical. It is the economic difficulties, expressed

principally in shortages of personnel, and the historical development of European hospitals that have caused the medical problems, and not the systems of insurance or public support of medical services. The latter have been corrective measures designed to adjust to the underlying social situation, and without them the professional problems would be more serious. The ultimate attainment of Europe's health service goals will depend on the achievement of world peace and the improvement of general economic conditions.

NUTRITIONAL STATUS OF SELECTED POPULATION GROUPS IN OREGON

I. FOOD HABITS OF NATIVE BORN AND REARED SCHOOL CHILDREN IN TWO REGIONS¹

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NUMEROUS studies have been made on the food habits of various population groups. These have led to the accumulation of valuable data which have revealed racial, national, and regional dietary patterns as well as dietary excesses and deficiencies. Reference will be made to the reports of some of the studies in the discussion of the results of the investigation to be reported in this paper.

From February 15 to May 4, 1948, an investigation was made of the nutritional status of population groups in selected areas of Oregon. This investigation included the following phases: studies on dietary habits, examination of the teeth (Hadjimarkos and Storvick) (1), bacteriological and chemical tests on the saliva (Sullivan and Storvick) (2), biochemical tests on the blood, physical inspections for signs of nutritional deficiencies (not yet published), and analyses of public water supplies for fluorine and total hardness (Storvick and Sullivan) (3).

This paper is a report of dietary studies on population groups in the Coast and Central Oregon Regions. Two counties

¹ From the Oregon Agricultural Experiment Station and the School of Home Economics, Oregon State College.

This study was a part of the Western Regional Research Project on Nutritional Status of Population Groups in Selected Areas of Oregon with the cooperation of the Oregon Agricultural Experiment Station. It was financed in part from funds appropriated under the Research and Marketing Act of 1946. The cooperation and assistance of the Bureau of Human Nutrition and Home Economics, United States Department of Agriculture and the United States Public Health Service is acknowledged.

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were selected in each Region: Clatsop and Coos in the Coast Region and Deschutes and Klamath in the Central Oregon Region. These counties, which represent two widely different agricultural and climatic areas in Oregon (Hadjimarkos, Storvick and Sullivan) (4), were chosen because they were more densely populated than the others in those regions as well as the fact that they had well-organized County Health Departments.

MATERIAL AND METHODS

The subjects selected for this study were 14, 15 and 16 year old school children. Since one of the aims of the investigation was to determine whether or not geographic location was a factor in the nutritional status of the children, only those children who were native born and reared were included in the study. The method of Dean and coworkers (5) was followed closely for the acceptance of a child in this classification. He was so classified if, during the first eight years of his life, no break had occurred in continuity of residence within his native county which totaled more than one month in any calendar year, and also if after his eighth birthday and up to the time of the study he had not been absent from the county for a length of time which totaled more than three months in any calendar year.

The school nurses and/or teachers assisted in determining the eligibility of the children for the study, and each child who met the requirements was given a printed form with a brief statement regarding the nature of the study and a place for the parent's signature if he was willing to give consent for his child to participate in the study. The final arrangements and examination schedules were made by a public health nurse who was on the Regional staff. Children were scheduled for examinations at the rate of twenty-four per day and each child was at the research center for a period of two to two and one-half hours.

Three hospital-trained dietitians were responsible for col-

lecting and evaluating the data on food habits. They collaborated with the Regional Committee³ on Dietary Studies in the preparation of a form for recording dietary information and in the discussion of methods by which such information could best be obtained and evaluated under the conditions of this study.

A combination of the record of a 24-hour food intake and dietary history based on a check list, was used to obtain information on food habits. Each child was given a form (Fig. 1, Appendix I) which included instructions and space for him to record his food intake for a 24-hour period. This also made him aware of the dietary aspect of the study. The dietary history (Fig. 2, Appendix I) was taken by one of the dietitians the next day, and was an attempt to obtain an overall picture of the child's eating habits by asking him what his customary consumption was in terms of servings per day or week, of the foods included on the check list. The 24-hour food intake as recorded by the child was used by the dietitian only as a guide and check on the information obtained during the interview; e.g., on the consumption of individual foods as well as such items as candy, carbonated beverages and supplements.

All diet evaluations were based on the information obtained through the use of the check list but vitamin supplements were not included. The diets were evaluated for the following nutrients: calcium, iron, protein, vitamin A value, ascorbic acid, thiamine, riboflavin and niacin using the Food Value Tables for the Calculation of Diet Records (United States Public Health Service) (6), Food Sources of Seven Nutrients (Boyd and Eads) (7) and Food Values of Portions Commonly Used (Bowes and Church) (8). Levels of adequacy were those recommended by the Food and Nutrition Board of the National Research Council (9). The standards used for judging the dietaries, with the classification according to level of intake of each nutrient expressed as adequate = 1, borderline

³ Appreciation is expressed to Miss Helen Walsh, Nutritionist, California State Department of Health for serving on this Committee.

= 2 and deficient = 3, are shown in Table 1. A score of 1 in-

Table 1. Standards for judging dietaries.

SCORE	1 (Adequate)	2 (Borderline)	3 (Deficient)
<i>Protein</i>			
Girls 13-15	80 gms.	79-50	less than 50
Girls 16-20	75	74-50	less than 50
Boys 13-15	85	84-55	less than 55
Boys 16-20	100	99-65	less than 65
<i>Calcium</i>			
Girls 13-15	1.3 gms.	1.2 -0.8	less than 0.8
Girls 16-20	1.0	0.99-0.6	less than 0.6
Boys 13-20	1.4	1.3 -0.9	less than 0.9
<i>Iron</i>			
All	15 mg.	14-10	less than 10
<i>Vitamin A Value</i> —Judgment needed as to whether main supply is as carotene or vitamin A. ¹			
Girls 13-20	5,000 I.U.	4,999-3,300	less than 3,300
Boys 13-15	5,000	4,999-3,300	less than 3,300
Boys 16-20	6,000	5,999-4,000	less than 4,000
<i>Thiamine</i>			
Girls 13-15	1.3 mg.	1.2-0.8	less than 0.8
Girls 16-20	1.2	1.1-0.8	less than 0.8
Boys 13-15	1.5	1.4-1.0	less than 1.0
Boys 16-20	1.7	1.6-1.2	less than 1.2
<i>Riboflavin</i>			
Girls 13-15	2.0 mg.	1.9-1.3	less than 1.3
Girls 16-20	1.8	1.7-1.2	less than 1.2
Boys 13-15	2.0	1.9-1.3	less than 1.3
Boys 16-20	2.5	2.4-1.7	less than 1.7
<i>Niacin</i>			
Girls 13-15	13 mg.	12-8	less than 8
Girls 16-20	12	11-8	less than 8
Boys 13-15	15	14-10	less than 10
Boys 16-20	17	16-12	less than 12
<i>Ascorbic Acid</i>			
Girls 13-15	80 mg.	79-53	less than 53
Girls 16-20	80	79-53	less than 53
Boys 13-15	90	89-60	less than 60
Boys 16-20	100	99-66	less than 66

¹ See Recommended Dietary Allowances, National Research Council Reprint and Circular Series, No. 129, October 1948, p. 10-11. (9)

dicated that the recommended allowances of the National Research Council were met, a score of 2, that approximately 67 through 99 per cent of those allowances were met and a score of 3, that less than 67 per cent of those allowances were met.

Other information obtained by the dietitian was the use of medicines, laxatives and vitamin preparations. The consumption of candy and carbonated beverages was of interest not only to the dietitian but also to the dentist since concentrated sweets and carbonated beverages have been reported to be conducive to dental decay (Michigan Workshop) (10). Since school lunch programs were active in all four counties, each child was asked what type of lunch he had, i.e., whether he carried his lunch from home, went home for it, ate in a commercial restaurant or in the school cafeteria. To facilitate the taking of the dietary histories, each child was asked whether or not his family had a garden or frozen food locker.

RESULTS

In the four counties selected there was a total of 4,410 children between the ages of 14 through 16, of whom 1,225, or 27.7 per cent, were eligible for the study. All of the children who obtained parental consent were included in this investigation, i.e., 766, or 62.7 per cent of those eligible.

For the sake of homogeneity of the sample the results on white children, only, are included, or 756 of the 766 children examined. Dietary histories on 17 of the children were excluded since they were not considered valid. Therefore, this discussion will be based on the results obtained on 739 children.

Table 2 shows for each county and region the per cent of children eligible for the examination and the per cent by sex, in the three age groups combined, for the 739 children whose dietary histories will be discussed in this paper.

The distribution, by age and sex, of the children examined in the four counties is shown in Table 3.

Table 4 presents the mean weekly food consumption, by sex, of 739 Oregon school children. For the preparation of this

REGION	COUNTY	SEX	PER CENT OF CHILDREN ELIGIBLE	PER CENT OF ELIGIBLE CHILDREN EXAMINED
<i>Coast</i>	Clatsop	Boys	32	55
		Girls	27	59
		Both sexes	29	57
	Coos	Boys	34	69
		Girls	34	67
		Both sexes	34	68
<i>Central Oregon</i>	Deschutes	Boys	22	39
		Girls	27	67
		Both sexes	24	54
	Klamath	Boys	24	64
		Girls	24	69
		Both sexes	24	67

Table 2. Per cent of native born and reared school children eligible for examination and the per cent of eligible children examined, expressed for three age groups combined.

Table 3. Age and sex distribution of 739 native born and reared school children examined in two geographic regions in Oregon.

REGION	COUNTY	SEX	AGE IN YEARS (LAST BIRTHDAY)			
			14	15	16	All Ages
<i>Coast</i>	Clatsop	Boys	36	23	30	89
		Girls	35	30	21	86
		Both sexes	71	53	51	175
	Coos	Boys	46	52	25	123
		Girls	48	33	33	114
		Both sexes	94	85	58	237
<i>Central Oregon</i>	Deschutes	Boys	11	10	16	37
		Girls	25	25	24	74
		Both sexes	36	35	40	111
	Klamath	Boys	36	36	29	101
		Girls	39	44	32	115
		Both sexes	75	80	61	216
<i>Both</i>	All	Boys	129	121	100	350
		Girls	147	132	110	389
		Both sexes	276	253	210	739

Table 4. Average food consumption, by sex, of 739 school children of two geographic regions of Oregon.

FOOD	MALES Serv/Week	FEMALES Serv/Week
Milk	28.90	21.22
Cheese, Cottage and American	1.97	2.01
Eggs	7.58	5.14
Meat		
Pork	2.00	1.63
Beef, Veal, Lamb	4.48	4.19
Liver	0.25	0.24
Poultry	0.45	0.42
Fish	1.09	0.93
Legumes	1.46	1.11
Fruits		
Oranges	3.92	4.34
Grapefruit	1.01	0.90
Citrus Juice	2.42	2.63
Yellow Fruit, Peaches and Apricots	1.69	1.58
Raw Fruit ¹	4.58	5.20
Apples	2.15	3.02
Bananas	1.79	1.68
Cooked Fruit ²	2.22	2.04
Vegetables		
Potatoes, Irish	8.54	6.94
Cabbage, Raw	1.04	1.09
Cooked	0.40	0.33
Greens	0.34	0.06
Yellow, All	2.47	2.49
Carrots	2.05	2.15
Other Raw, All	3.52	4.59
Lettuce	1.77	2.47
Celery	0.50	0.59
Other Cooked, All	4.09	4.85
Cereal		
Cooked	2.89	1.73
Prepared	1.96	1.13
Macaroni and Rice	1.13	1.12
Bread	47.90	29.61
Other Breads		
Pancakes and Waffles	2.04	1.12
Sweet Rolls	1.82	1.26
Biscuits, Crackers, etc.	2.25	1.77
Pies, Cakes, and Cookies	6.92	5.92
Sweets		
Candy Bars	4.62	4.04
Jelly, Jam	3.77	2.09
Syrup and Molasses ³	2.02	1.26
Beverages		
Cocoa	2.63	2.47
Coffee	2.38	1.71
Carbonated Beverages	3.56	2.92

¹ Raw fruit includes both apples and bananas.

² Cooked fruit includes all fruits except that which is recorded under yellow fruit.

³ Almost no molasses recorded.

table, certain items were omitted from the check list because (1) they could not be interpreted uniformly in terms of servings, e.g., prepared meat, butter and peanut butter, or (2) because there was insufficient information about them (strawberries, tomatoes, and cantaloupe were out of season and the youngsters could not estimate their consumption of these foods).

An inspection of the table reveals that the most outstanding differences in food intake were the greater quantities con-

Table 5. Per cent of children in the two regions with corresponding scores for each of eight nutrients.

NUTRIENT	SCORE ¹	COAST REGION Per Cent	CENTRAL OREGON REGION Per Cent	BOTH REGIONS Per Cent
Calcium	1	65.3	65.4	65.4
	2	21.1	20.2	20.7
	3	13.6	14.4	13.9
Iron	1	41.0	40.1	40.6
	2	36.2	40.7	38.2
	3	22.8	19.3	21.2
Protein	1	70.2	71.6	70.8
	2	26.9	23.9	25.6
	3	2.9	4.6	3.7
Vitamin A Value	1	82.8	80.4	81.7
	2	13.8	15.9	14.7
	3	3.4	3.7	3.5
Ascorbic Acid	1	45.4	40.1	43.0
	2	29.9	35.8	32.5
	3	24.5	24.2	24.5
Thiamine	1	66.0	69.4	67.5
	2	28.9	24.8	27.1
	3	5.1	5.8	5.4
Riboflavin	1	78.2	74.9	76.7
	2	15.3	15.9	15.6
	3	6.7	9.2	7.7
Niacin	1	65.5	63.3	64.5
	2	29.4	28.4	29.0
	3	5.1	8.3	6.5

¹ 1 = adequate, 2 = borderline, 3 = deficient.

sumed by the boys of milk, eggs, potatoes, bread, cereals in general, pies, cakes and cookies, and sweets. The girls, on the other hand, ate slightly more vegetables and fruits than did the boys.

To meet the higher requirements of the National Research Council recommended allowances (Table 1), boys would, of necessity, need to consume more foods than would girls of comparable age to maintain an optimum nutritional level. Though the above-mentioned differences in food consumption would indicate that, on the whole, the boys might be expected to be in a better state of nutrition than the girls, it was desirable to evaluate the food intake in terms of nutrients for a more complete picture of the probable adequacy of the diet.

A general picture of the nutritive value of the diets, in terms of eight nutrients: calcium, iron, protein, vitamin A value, ascorbic acid, thiamine, riboflavin and niacin, for the children studied in both regions is shown in Table 5. It is apparent that over 60 per cent of the children had diets which were adequate in all of the nutrients except iron and ascorbic acid. For the last mentioned nutrients, 40.6 and 43.0 per cent, respectively, of the children had adequate intakes. Less than 10 per cent of the children had diets which were classified as inadequate in five of the eight nutrients. For the other three nutrients, calcium, iron and ascorbic acid, 13.9, 21.2, and 24.5 per cent, respectively, had diets which were rated inadequate.

Table 5 also shows the per cent of the children in each of the two regions with corresponding scores for eight nutrients. Without exception, a striking similarity in the distribution of the scores in the two regions is noted.

When the data on level of intake of each nutrient were classified according to age and county, no consistent differences were noted. Likewise, when the data were classified according to level of intake of each nutrient for each county for the three ages combined, no differences were noted.

Sex differences in nutrient score are very marked (Table 6). A higher per cent of boys had dietaries which scored 1 in all

Table 6. Per cent of boys and girls in each county with corresponding scores for each nutrient.

NUTRIENT	SCORE	CLATSOP COUNTY		COOS COUNTY		DESCHUTES COUNTY		KLAMATH COUNTY	
		Boys Per Cent	Girls Per Cent	Boys Per Cent	Girls Per Cent	Boys Per Cent	Girls Per Cent	Boys Per Cent	Girls Per Cent
Calcium	1	80.9	59.3	71.5	50.9	83.8	54.1	73.3	60.0
	2	11.2	22.1	15.4	34.2	10.8	27.0	18.8	20.0
	3	7.9	18.6	13.0	14.9	5.4	18.9	7.9	20.0
Iron	1	46.1	18.6	71.5	21.1	70.3	27.0	61.4	20.0
	2	28.1	43.0	22.0	52.6	21.6	44.6	31.7	52.2
	3	25.8	38.4	6.5	26.3	8.1	28.4	6.9	27.8
Protein	1	77.5	65.1	80.5	57.0	89.2	62.2	81.2	63.5
	2	21.3	31.4	18.7	36.8	5.4	32.4	17.8	29.6
	3	1.1	3.5	0.8	6.1	5.4	5.4	1.0	7.0
Vitamin A Value	1	80.9	79.1	90.2	78.9	86.5	78.4	84.2	76.5
	2	12.4	15.1	9.8	18.4	13.5	18.9	15.8	14.8
	3	6.7	5.8	0.0	2.6	0.0	2.7	0.0	8.7
Ascorbic Acid	1	28.1	54.7	42.3	55.3	37.8	50.0	33.7	40.0
	2	37.1	30.2	28.5	25.4	37.8	32.4	38.6	34.8
	3	34.8	15.1	29.3	19.3	24.3	17.6	27.7	25.2
Thiamine	1	70.8	55.8	81.3	53.5	86.5	67.6	74.3	60.9
	2	27.0	39.5	16.3	36.0	10.8	24.3	20.8	33.0
	3	2.2	4.7	2.4	10.5	2.7	8.1	5.0	6.1
Riboflavin	1	88.8	74.4	87.8	62.3	91.9	66.2	83.2	67.8
	2	7.9	18.6	8.1	26.3	5.4	18.9	10.9	21.7
	3	3.4	7.0	4.1	11.4	2.7	14.9	5.9	10.4
Niacin	1	64.0	59.3	79.7	56.1	86.5	58.1	72.3	51.3
	2	31.5	33.7	17.1	37.7	10.8	31.1	18.8	40.9
	3	4.5	7.0	3.3	6.1	2.7	10.8	8.9	7.8

	COAST		CENTRAL OREGON	
	Clatsop	Coos Per Cent	Deschutes Per Cent	Klamath Per Cent
Gardens	— ¹	75.9	73.9	69.0
Frozen food lockers	— ¹	45.6	67.6	70.4

¹ Data for Clatsop County were not obtained.

Table 7. Per cent of children in three counties in two regions whose families had gardens and lockers.¹

of the nutrients except for ascorbic acid, in which case a higher per cent of girls had dietaries which scored 1. As the dietitians were interviewing the children they were very aware that the girls had a greater interest in fruits and vegetables than did the boys. The sex differences in vitamin A value were not as marked as for the other nutrients but in three of the counties none of the boys had dietaries which scored 3 in vitamin A value.

The data obtained regarding gardens are shown in Table 7 and reveal that a remarkably high per cent of the children came from families who had gardens. The common use of frozen food lockers is apparent in the same table.

Information regarding the types of lunches which the children had is summarized in Table 8. The data show that the highest per cent of children in Coos County carried their lunches, whereas in Deschutes County the majority of them

Table 8. Per cent of children in three counties in two regions classified according to type of lunch.¹

TYPE OF LUNCH	COAST		CENTRAL OREGON	
	Clatsop	Coos Per Cent	Deschutes Per Cent	Klamath Per Cent
Carry	— ¹	48.5	30.6	23.6
Home	— ¹	16.0	53.2	16.7
School Cafeteria	— ¹	13.5	1.8	36.6
Downtown	— ¹	5.1	6.3	9.3

¹ Data for Clatsop County were not obtained.

COUNTY	CANDY ¹				
	Mean Consumption Serv/Week	Range Serv/Week	Distribution of Consumption		
			Less than 1 Serv/Day Per Cent	One Serv/Day Per Cent	More than 1 Serv/Day Per Cent
Clatsop	4.4	0-32	75	15	10
Coos	4.8	0-23	65	20	14
Deschutes	3.5	0-17	81	11	8
Klamath	4.2	0-23	78	12	10
	CARBONATED BEVERAGES ²				
Clatsop	3.4	0-14	82	15	3
Coos	3.7	0-42	81	11	8
Deschutes	2.9	0-14	85	13	3
Klamath	2.7	0-21	88	9	3

¹ One candy bar constitutes one serving.

² 6 oz. constitutes one serving.

Table 9. Mean consumption of candy bars and carbonated beverages together with their ranges and distribution of consumption for 739 school children of Oregon.

went home for lunch and in Klamath County the highest per cent of the children ate in the school cafeteria. In all counties, the per cent of the children who ate their lunches downtown was small.

The mean weekly consumption of candy bars and carbonated beverages together with their ranges and the distribution of consumption, are shown in Table 9. Although the data show

Table 10. Per cent of children in each region who took vitamin preparations, laxatives and/or medicines.

SUPPLEMENTS	COAST Per Cent	CENTRAL OREGON Per Cent
Vitamin Preparations	32.0	19.0
Laxatives	7.5	11.9
Medicines	23.1	19.9

that the consumption of these items was higher in the Coast Region than in the Central Oregon Region, it is doubtful whether the differences in the mean consumption can be considered physiologically significant.

The information obtained on the use of vitamin preparations, laxatives and medicines for all children for the two regions is shown in Table 10. The Coast Region had a higher per cent

Table 11. Per cent of Oregon and Tennessee children whose dietaries contained less than the recommended allowances of the National Research Council.

NUTRIENT	OREGON Per Cent	TENNESSEE ¹ Per Cent
Calcium	35	87
Iron	59	84
Protein	29	78
Vitamin A Value	18	60
Ascorbic Acid	57	68
Thiamine	33	93
Riboflavin	23	85
Niacin	36	*

* Dietaries not evaluated for niacin.

¹ Data for 113 white adolescents aged 13 to 20 years.

of children taking vitamin preparations and a lower per cent of children taking laxatives. The use of medicines by the children was nearly the same for the two regions.

COMMENTS

The results of a study by Youmans (11) on Tennessee children ranging in age from 13 to 20 revealed that the dietaries of a

high per cent of them did not meet the 1943 Recommended Allowances of the National Research Council (12). Although the Recommended Allowances of 1948 were used in judging the adequacy of the dietaries of the Oregon children, a much smaller per cent of them than of the Tennessee children had dietaries which contained less than the Recommended Allowances (Table 11). The Recommended Allowances of 1943 and 1948 for protein, calcium, iron, vitamin A value and ascorbic acid were the same for these age groups; small reductions were made in 1948 in the Recommended Allowances for thiamine, riboflavin, and niacin for the age group 13 to 20.⁴ If the Tennessee data had been calculated using the 1948 Recommended Allowances, perhaps a smaller per cent of the dietaries might have been below the amounts recommended for these vitamins but there still would be a marked difference in the adequacy of the dietaries of the children of the two states.

⁴ Recommended allowances in 1943 and 1948, respectively, are: thiamine, 1.6 mg. and 1.4 mg.; riboflavin, 2.3 mg. and 2.1 mg.; niacin, 16 mg. and 14 mg.

Food	TEXAS	OREGON		
	White Children Serv/Wk	Clatsop County Serv/Wk	Coos County Serv/Wk	Deschutes County Serv/Wk
Cereals (All Kinds)	28.00	52.10	58.89	54.75
Pie, Cake, etc.	5.00	5.97	6.78	6.55
Oats ²	1.67	—	—	—
Milk	15.91	24.50	24.35	24.63
Meat	8.14	7.22	8.37	8.23
Butter ²	5.38	—	—	—
Eggs	3.50	5.31	7.05	5.90
Vegetables				
Irish Potatoes	3.50	6.33	8.25	9.50
Beans (Dry) ³	1.63	1.21	1.51	1.08
Lettuce	1.04	1.28	2.38	2.49
Peas (All Kinds) ²	0.86	—	—	—
Tomato ²	0.85	—	—	—
Sweet Potatoes ⁴	0.74 ¹	2.87	2.48	2.21
Cabbage and Kraut ⁵	—	1.32	1.53	1.44
Greens	—	1.09	0.84	0.96
Fruits				
Apple	2.41	1.89	3.16	2.53
Jam, Jelly, Preserves	1.27	2.02	2.94	4.04
Orange	1.21	3.97	4.50	4.36
Banana	0.89	1.04	1.95	1.70
Grapefruit	0.69 ¹	1.22	0.74	1.04
Citrus Juices ⁶	—	1.90	2.70	2.64
Yellow Fruit ⁶	—	1.32	1.82	1.79
Sweets and Beverages				
Candy	1.79	4.42	4.77	3.49
Syrup and Molasses ⁷	1.25	1.49	1.73	2.11
Cocoa	1.08	3.11	2.53	2.22
Coffee	0.95	3.00	2.05	1.07
Carbonated Beverages ⁶	—	3.36	3.72	2.89

¹ Winter only.² No data available for Oregon children.³ Legumes of all kinds for Oregon children.⁴ Yellow vegetables of all kinds for Oregon children.⁵ Almost no kraut for Oregon children.⁶ No data given for Texas children.⁷ Almost no molasses for Oregon children.

Table 12. Comparison of foods most frequently eaten by Texas school children and Oregon school children. Foods are expressed as average number of servings per week.

Klamath County Serv/Wk	All four Counties Serv/Wk
52.07	54.67
6.23	6.39
—	—
25.82	24.86
7.47	7.82
—	—
6.47	6.30
7.26	7.70
1.17	1.28
2.39	2.14
—	—
2.31	2.48
1.41	1.43
0.95	0.95
2.63	2.61
2.94	2.89
3.77	4.14
2.08	1.73
0.93	0.95
2.80	2.53
1.60	1.63
4.16	4.32
1.35	1.62
2.26	2.54
1.68	2.02
2.74	3.22

The results of the study on the dietary habits of a selected group of Oregon children showed that, on the whole, the nutrient scores of the dietaries for the boys were higher than those for the girls. Trulson, Hegsted and Stare (13) in their studies on adolescent children in New York and Young and Storvick (14) in their study on college freshmen, also observed that the dietaries of the boys were superior to those of the girls as far as nutritive value was concerned. Whitacre (15) on the other hand, in a report of her study on Texas school children, stated that the girls' dietaries were better than those of the boys.

Based on the results of her study on the dietary habits of school children in three regions in Texas, Whitacre (15) reported that there were no pronounced regional differences in dietary habits. Likewise, in this study on Oregon children no regional differences were observed, (Table 12). Surprisingly, the foods which were most commonly eaten by the Texas children were essentially the same for those of Oregon, so that little difference is indicated in the dietary habits between the children of the two states when selection of food items alone is considered. However, as it is shown in Table 12, the average consumption of individual food items by the

white children of the two states was considerably different. Though the average consumption of meat, generally, was about equal for the two groups (no prepared meats were included in the calculations for the Oregon children), Oregon children included more milk, eggs, Irish potatoes, cabbage, fruit, candy, and cereals of all kinds in their diets than did the children of Texas.

When a comparison was made of the results of a study (Moser) (16) on South Carolina children with those obtained in Oregon, it was found that cornmeal and pork were among the most commonly consumed foods in South Carolina. In Oregon pork was regularly included in the diets of the children, but the meat most commonly eaten was beef. Cornmeal was not used to any appreciable extent by Oregon children.

In comparing the results of the studies of Adamson et al., (17) Metcalf et al., (18) and Aykroyd et al., (19) in Newfoundland with those in Oregon the differences in the food intake were both qualitative and quantitative. The children of Newfoundland consumed more fish and potatoes but less milk, meat, fruits, and vegetables than did those of Oregon.

Dietary studies, in spite of all the problems they present, yield valuable information regarding the food habits of population groups and the nutritive value of the dietaries characteristic of certain groups. There is probably no method of obtaining information concerning food habits which is entirely satisfactory for all people under different circumstances and which can be used equally well by all interviewers.

The method which involves weighing every serving of food for a given length of time and analyzing aliquots of those foods for nutritive value give very exact data for that period of study. There is no assurance, however, that such a record is indicative of the customary food intake habits of the individual. The study on Oregon children reported in this paper was an attempt to obtain information on customary food habits. Though it is not as quantitative as the method described above, the results on 739 children gave indications of dietary trends and the per cent of children whose dietaries were adequate, borderline or inadequate in each of eight nutrients for selected population groups in geographic areas on county and regional bases.

The relationship of the results of the dietary studies to the data obtained from physical inspections for signs of nutritional deficiencies, biochemical tests on the blood and dental examinations will be discussed in another paper.

SUMMARY

Native born and reared white school children, in four counties of Oregon representing two geographic regions, were included in a study on food habits. The methods which were used to obtain information regarding the food habits of 739 children, 14, 15 and 16 years of age are described.

The records of food intake were evaluated for each of eight nutrients: calcium, iron, protein, vitamin A value, ascorbic acid, thiamine, riboflavin and niacin. Levels of intake were classified as adequate, borderline or inadequate when compared to the National Research Council recommended dietary allowances. Over 60 per cent of the children had dietaries which were adequate in all of the nutrients except iron and ascorbic acid. Less than 10 per cent of the children had diets which were classified as inadequate in protein, vitamin A value, thiamine, riboflavin and niacin.

No regional, county or age differences in the nutritive values of the dietaries were observed. Sex differences in nutrient score were very marked. The boys' dietaries were, in general, superior to those of the girls' with respect to all nutrients except ascorbic acid.

The families of over 45 per cent of the children had frozen food lockers and 69 per cent or more had gardens.

Marked differences in the quantities of foods commonly consumed by the Oregon children and those consumed by the children of Texas, South Carolina, Tennessee and Newfoundland were observed.

The authors express their appreciation to Evelyn L. Warren and Clara Young for their assistance in the preparation of this paper.

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APPENDIX I

Figure 1

Instructions to Child
Western Regional Research Project
Oregon

FOOD RECORD

We would like a record of what you ate for one day. Space for recording this information is provided on page two of this form. Write *only* on page two. Please read carefully the following instructions before you start to list the foods you have eaten.

1. WRITE DOWN EVERYTHING YOU PUT IN YOUR MOUTH AND SWALLOWED. If you miss a meal, write the word NOTHING in the space for that meal.
2. TELL HOW FOOD IS COOKED—FOR EXAMPLE, FRIED OR SCRAMBLED EGG, BAKED OR MASHED POTATO, CREAMED OR BUTTERED CARROTS. IF FOOD IS NOT COOKED BUT EATEN RAW, WRITE "RAW" AFTER IT.
3. WHEN YOU EAT TWO FOODS TOGETHER, WRITE DOWN BOTH OF THEM—like this:
 1 white roll with 1 teaspoon jelly.
 ½ cup mashed potato with 1 tablespoon gravy.
4. WRITE DOWN HOW MUCH YOU EAT OF EACH FOOD. Tell how many teaspoonfuls or tablespoonfuls you eat; tell whether you eat ¼ or ½ or 1 cupful, tell how many slices of bread.
5. BE SURE TO WRITE THE *KIND* OF FOOD YOU EAT. If you eat cereal, write oatmeal, shredded wheat biscuit or whatever kind of cereal it is. BE SURE TO TELL THE *KIND* if you eat any of these foods: bread, meat, peas, beans, potatoes, soups, salads, or sandwiches—like this:
 Soups—cream of tomato, navy bean, split pea, vegetable
 Salads—mixed vegetable (raw), fruit (cooked), tuna
 Sandwiches—2 slices of whole wheat bread, butter, peanut butter
 2 slices white enriched bread, mayonaise, American cheese
6. IF YOU TAKE WHEAT GERM, YEAST, COD LIVER OIL, VITAMIN PILLS, MEDICINE, ETC., PLEASE LIST UNDER SUPPLEMENTS AT THE BOTTOM OF THE PAGE—Otherwise write the word NOTHING.

After you finish writing your record, see if you did these things:

1. Did you write down only the foods you put in your mouth and swallowed?
2. Did you write down HOW MUCH you ate or drank?
3. Did you miss a meal? If so, did you write the word NOTHING in the space for that meal? If you didn't eat between meals, did you write the word NOTHING in the space for between-meal food?
4. Do you take wheat germ, yeast, cod liver oil, etc.? If so, did you list under supplements? If not did you write the word NOTHING under supplements?

Figure 1 (Continued)
Food Record for 24 hours

Name Date
Month Day Year

Address Age Sex
Years Months

FOOD EATEN ON
Day of week

Food	Amount	Food	Amount
...

BREAKFAST

BETWEEN BREAKFAST AND NOON MEAL

NOON MEAL

BETWEEN NOON AND EVENING MEAL

EVENING MEAL

AFTER EVENING MEAL

SUPPLEMENTS

Figure 2
CHECK LIST

Record Number W.I.C.M.O.X. Group

Place Rural Urban

Town County

-
- R—
1. Milk whole P— skim buttermilk
 2. Cheese—cottage American other
 3. Egg
 4. Meat—pork beef, veal, lamb liver
 - Prepared meat poultry fish
 5. Legumes
 6. Nuts peanut butter
 7. Fruits—citrus (canned or fresh) tomatoes (canned or fresh).....
 - cantaloupe strawberries
 - yellow fruit
 - other raw
 - other cooked
 8. Vegetables—potatoes (white) cabbage (raw) (cooked)
 - green
 - yellow
 - other raw
 - other cooked
 9. Fats—butter margarine cream
 10. Cereal—cooked
 - prepared
 - macaroni, rice, etc.
 - Bread—whole grain enriched other
 11. Desserts—pies cakes cookies
 - milk puddings ice cream
 12. Sweets—candy sugar gum
 - jelly, jam syrup molasses
 13. Beverages—cocoa coffee tea soft drinks
 - alcoholic water
 14. Salt—iodized plain
 15. Supplements—Vitamins
 - Laxatives
 - Medicines

Calcium	1	2	3	Ascorbic Acid	1	2	3
Iron	1	2	3	Thiamine	1	2	3
Protein	1	2	3	Riboflavin	1	2	3
Vitamin A value	1	2	3	Niacin	1	2	3

THE CONTROL OF ACUTE RESPIRATORY ILLNESS BY ULTRA-VIOLET LIGHTS

STUDY NO. 2

JEAN DOWNES¹

THE STUDY of acute respiratory illness was conducted in two communities, Pleasantville and Mt. Kisco, in Westchester County, New York. Pleasantville is thirty-one miles (one hour by train) from the central part of New York City, and Mt. Kisco is six miles north of Pleasantville. This investigation was carried on in cooperation with Dr. Mildred W. Wells, of the Westchester County Department of Health, who initiated a study of measles and chicken pox in the two communities.

The objective of the investigation conducted by the Westchester County Department of Health was a study of the channels of flow of measles and chicken pox through a suburban community and investigation of the possibilities of interrupting these channels by ultra-violet irradiation of the atmospheres shared by the children of one community, Pleasantville. The other community, Mt. Kisco, was to serve as a control for comparison with the experimental community.

According to Dr. Wells, the original plan of her study did not include observation of the occurrence of acute respiratory illness such as colds "because of the short incubation period believed to be characteristic of such illnesses, the multiplicity of exposure in and out of the school, and the confusion of the patterns of spread by the inclusion of adults in the population at risk." However, the Milbank Memorial Fund, recognizing the complexity of the problem, felt it was worth while

¹ From the Milbank Memorial Fund. This is the second of a series of papers dealing with a study of the control of acute respiratory illness by ultra-violet lights.

This paper, the second in the series, includes all of the data presented before the Epidemiological Section of The American Public Health Association's Seventy-Eighth Annual Meeting in St. Louis, Missouri, November 2, 1950, and published as Part I in the December, 1950 issue of the *American Journal of Public Health*. The data from this particular paper are included with the permission of the *American Journal of Public Health*.

to study the morbidity from colds and other acute respiratory illnesses in the two communities. The Fund is greatly indebted to Dr. Wells for her ready and continued cooperation in this endeavor.

A description of the type of ultra-violet lights and their installation in Pleasantville, the experimental community, is quoted from a paper published by Wells and Holla (1).

"During the first three months of 1946, ultra-violet lights were placed in all the schools of Pleasantville, in three of the Sunday schools, in the Children's Room of the Library, in the village movie, and in the Department of Health Clinic rooms. During the autumn of 1946, three churches were equipped, the Girl and Boy Scout huts, and the most patronized of the soda fountains. Not until December, 1947, was it possible, however, to irradiate the Catholic Church. Only one group refused cooperation, the Christian Scientists. Although the village movie was one of the first places equipped with lights, the several designs used have not been wholly satisfactory.

"Indirect fixtures containing thirty-watt hot cathode germicidal lamps were mounted seven feet from the floor on the end walls on the basis of two units per typical schoolroom. Expressed in the tentative terminology of the Society of Heating and Ventilating Engineers, the average intensity throughout the irradiated zone of a typical room was 19 milliwatts per sq. ft. (19 microwatts per sq. cm.) or a total lethal irradiation of 61 foot-watts for the irradiated volume of 3,200 cu. ft. Care was at all times taken to see that intensities at the working level were below the maximum specified by the Council of Physical Medicine of the American Medical Association for seven-hour occupancy (2)."

Ultra-violet lights were not placed in the homes. The hours per school day spent by children under the ultra-violet lights varied from three for those in kindergarten to six for older children.

DATA AND METHOD OF STUDY

There are certain strict requirements which must be met if

an experiment such as this is to have validity. The requirements are as follows:

1. The control population must be similar in all essential respects to the experimental population except for the specific factor introduced into the latter.
2. The observation of results must be comparable for the control and experimental populations.
3. Relevant data capable of evaluation and statistical study must be obtained for both populations with equal care and exactness.

The two communities were fairly comparable with respect to size. According to the 1940 Census, there were 4,454 persons living in the incorporated village of Pleasantville and 5,941 in the village of Mt. Kisco. Sixteen per cent of the population of Pleasantville were foreign born compared with 21 per cent in Mt. Kisco. In both communities the foreign born were chiefly Italian. Negroes formed a very small proportion of the population in either place; about 1 per cent in Pleasantville and 3 per cent in Mt. Kisco.

The periodic survey of families for the purpose of collection of illness records was the method employed in this study. All families in which there were one or more children attending grade school or high school in each of the two communities were included in the study. These families were visited every 28 days during the three school years September to June, 1946-1949. On each visit to the family, inquiry was made about acute respiratory illnesses which had occurred among their members during the past four weeks. Visits were not made during the summer months because it was believed that observation during that period would be incomplete since some children go to summer camps and often the entire family is away from the community for part or all of the summer.

Each family visitor was given a list of the common acute respiratory illnesses in the terminology generally used by a family informant. The list is as follows:

1. Cold, head cold, sneezing attack, sinusitis.

2. Sore throat, tonsillitis, septic sore throat, streptococcus sore throat, pharyngitis, quinsy, laryngitis, hoarseness, swollen cervical glands.

3. Bronchitis, chest cold, tracheitis, croup, cough.

4. Grippe, influenza, intestinal influenza or grippe.

5. Pneumonia, pleurisy, and asthma.

6. Earache with a cold or without a cold, otitis media, running ear, and mastoiditis.

Inquiry was made about the presence or absence of each type of illness among members of the family.

7. Inquiry was made concerning certain chronic conditions, as asthma and rheumatic fever.

The sickness record included the nature of the illness as stated by the informant, usually the mother, the date of onset and duration of illness, the onset and duration of disability and the number of days in bed, the amount of medical care and, if hospitalized, the number of days in the hospital.

The sickness record also included (1) the order in which head, throat, or chest was involved in the illness; and (2) data concerning certain symptoms, that is, whether the illness was accompanied by aching in body or head, by cough, by fever, and by upset stomach, nausea, vomiting, or diarrhea.

Acute respiratory illness as reported in this analysis includes head colds or coryza, colds with sore throat, tonsillitis and septic sore throat, colds with chest complications, tracheitis, bronchitis or cough, and influenza. Their distribution in order of frequency was as follows: head colds, 47 per cent; colds with sore throat, 21 per cent; tonsillitis, 5 per cent; colds with chest symptoms, 22 per cent; and influenza or grippe, 5 per cent. Cases of intestinal influenza or intestinal grippe are shown separately.

The method of measurement of results of an experiment such as that conducted in Westchester County is a comparison of events that follow after the introduction of ultra-violet lights in one community with events that occur at the same time in another community where that factor is not present. The events in this instance are attacks of acute respiratory illness,

especially among school-age children. Since illness as it is commonly understood includes a subjective element, it is extremely important that the survey of illness be conducted according to standards which are applied and rigidly adhered to in both communities.

The standards which were set are as follows:

1. Visiting must be done with the same regularity in both communities.
2. The quality of work done by all of the visitors must be as nearly equal as possible.

There were three family visitors and one supervisor in each community. No visitor was to make more than ten visits a day. A careful check of the visiting rate in each community was made day by day and month by month to be sure that the work was not being done in undue haste in one community as compared with the other. A constant check of the quality of the work of the different family visitors was made. Every effort was made to keep the visiting at an equal rate and to maintain an equal quality of work in both communities.

It was thought wise to check the school records of absences for the children in the study families in each community to see if there were any lack of comparability between the two in this respect. Consequently, the data of absences were obtained for the children attending public schools in Pleasantville and in Mt. Kisco. These data were obtained for two three-month periods, October–December, 1945 (the year before the installation of the ultra-violet lights in Pleasantville) and March–May, 1946, the period when the lights were being installed. In neither period was there any significant difference between the two communities in the proportion of children absent because of illness. Also, there were no important differences in the incidence of absenteeism from all causes. In fact, the two communities were strikingly similar in these respects. For example, the proportions with no record of absence because of illness were 15 per cent for Pleasantville compared with 14 per cent for Mt. Kisco in the three-month period October–

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December of 1945 and 20 per cent in each community during the period March-May, 1946.

Visiting was started in both communities on February 1, 1946. The mean number of families visited during the three school years of the special study was 530 in Pleasantville and 570 in Mt. Kisco. The families in Pleasantville included some 2,100 persons and those in Mt. Kisco 2,400. In each group of families there were about 900 school-age children and 180 to 200 preschool-age children.

CHARACTERISTICS OF THE TWO COMMUNITIES

In the study of acute respiratory illness, data were obtained from each family which reveal certain social characteristics of the family. The data relevant to this analysis were: a census

Table 1. Loss of families in each year due to moving or refusal to cooperate, Pleasantville and Mt. Kisco, February, 1946-June, 1949.

CLASSIFICATION	FAMILIES VISITED			
	February-June, 1946	September, 1946-June, 1947	September, 1947-June, 1948	September, 1948-June, 1949
	RATE PER 100			
<i>Moved</i>				
Pleasantville	—	5.7	6.4	5.1
Mt. Kisco	—	4.7	5.3	5.8
<i>Refused to Cooperate</i>				
Pleasantville	0.6	1.7	0.8	0.6
Mt. Kisco	1.7	0.7	0.3	0.2
	NUMBER OF FAMILIES			
<i>Total</i>				
Pleasantville	508	541	533	513
Mt. Kisco	530	550	584	602
<i>Moved</i>				
Pleasantville	—	31	34	26
Mt. Kisco	—	26	31	35
<i>Refused to Cooperate</i>				
Pleasantville	3	9	4	3
Mt. Kisco	9	4	2	1

of the present household by age and sex of the members, marital status of the head of household, occupation and place of employment of all employed members, and highest education attained for all members.

Before examination of the social characteristics of the two communities, it is of interest to consider the loss of families in each study year due to moving of the family or unwillingness to cooperate. Table 1 shows these data. The moving rates were fairly similar in the two communities year by year. Also, they were approximately the same in Pleasantville compared with Mt. Kisco, from 5 to 6 per cent annually. The rate of refusal to cooperate was low in both communities; less than 1 per cent of the families asked to be omitted from the study. It would certainly seem that both communities were interested in the study.

Table 2 shows that the age distribution of the study population in the two communities was strikingly similar. Selection of families with school-age children would be expected to result in a comparable population unless some particular factor op-

Table 2. Percentage distribution of the population by age, Pleasantville and Mt. Kisco, September, 1947-June, 1948.¹

AGE GROUPS	1947-1948		
	Both Communities	Pleasantville	Mt. Kisco
TOTAL	100.0	100.0	100.0
0- 4	8.6	8.3	8.8
5- 9	14.3	14.6	14.1
10-14	12.1	12.4	11.9
15-19	12.4	11.3	13.3
20-24	4.7	4.6	4.8
25-34	10.2	9.1	11.1
35-44	20.4	21.0	19.9
45-54	10.6	10.8	10.4
55-64	3.4	4.0	2.9
65+	3.3	3.9	2.8
Total Persons	4,866	2,312	2,554

¹ Includes families observed 30 weeks or more during September, 1947-June, 1948.

erated in one community and did not affect the other community.

The age of husbands and wives (Table 3) was similar in both

Table 3. Mean age of heads of household and wives in Pleasantville and Mt. Kisco, September, 1947-June, 1948.¹

Classification	Mean Age	Standard Deviation
<i>Pleasantville</i>		
Head of Household	45.1 ± 0.39	8.52
Wives	40.8 ± 0.38	7.76
<i>Mt. Kisco</i>		
Head of Household	44.3 ± 0.38	8.62
Wives	39.6 ± 0.34	7.35

¹ Includes families observed 30 weeks or longer, September, 1947-June, 1948.

communities. The mean age of household heads in Pleasantville was 45 compared with 44 in Mt. Kisco. The corresponding mean ages of the wives were 41 and 40 in the respective communities.

The median size of family in Pleasantville and Mt. Kisco is shown in Table 4. The data are arrayed according to the age of the head of the household. In each community the size of the family increases as the age of the head increases. The two communities were strikingly similar with respect to the size of the family.

In 8 per cent of the families in Pleasantville and 9 per cent of those in Mt. Kisco, the head of the household was widowed, divorced, or separated from his or her spouse.

Table 4. Median size of family according to age of head of the household, Pleasantville and Mt. Kisco, 1947-1948.¹

AGE OF HEAD OF HOUSEHOLD	FIRST QUARTILE	MEDIAN	THIRD QUARTILE	FIRST QUARTILE	MEDIAN	THIRD QUARTILE
	Pleasantville			Mt. Kisco		
ALL AGES	4.15	4.88	5.80	4.15	4.87	5.98
25-39	4.28	4.84	5.57	4.15	4.72	5.72
40-54	4.03	4.85	5.84	4.08	4.88	5.96
55+	4.30	5.13	6.48	4.63	5.63	6.58

¹ Includes families observed thirty weeks or longer, September, 1947-June, 1948.

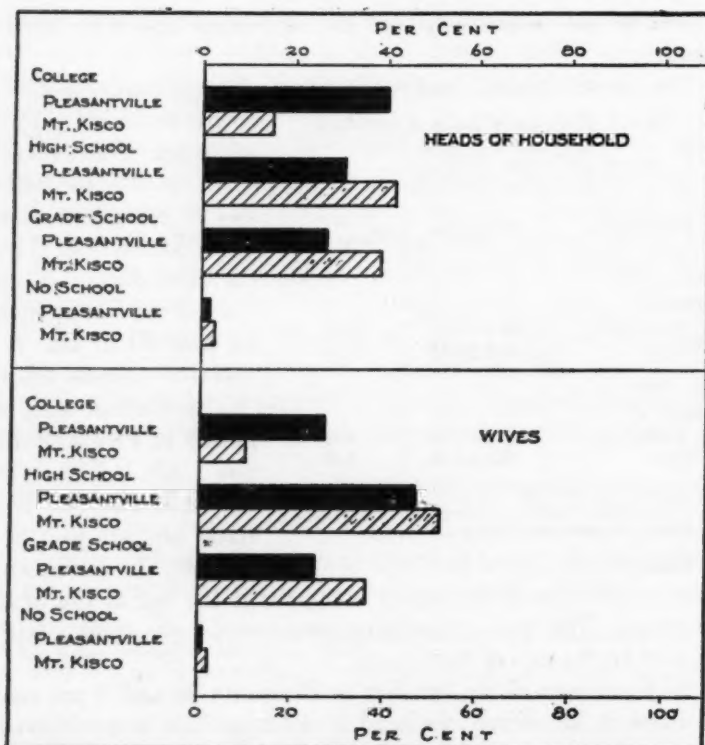


Fig. 1. Distribution of household heads and wives according to highest education attained, Pleasantville and Mt. Kisco.

Figure 1 shows for each community the distribution of the heads of household and the wives according to the educational attainment. The upper section of Figure 1 shows the data for household heads and the lower section shows the data for the wives. There was a definite difference between the two communities with respect to education of the head of the household. For example, 40 per cent of the heads of household in the Pleasantville families had a college education compared with 15 per cent in Mt. Kisco. The same differences were generally true of the wives in the two communities.

Figure 2 shows the household heads in each community dis-

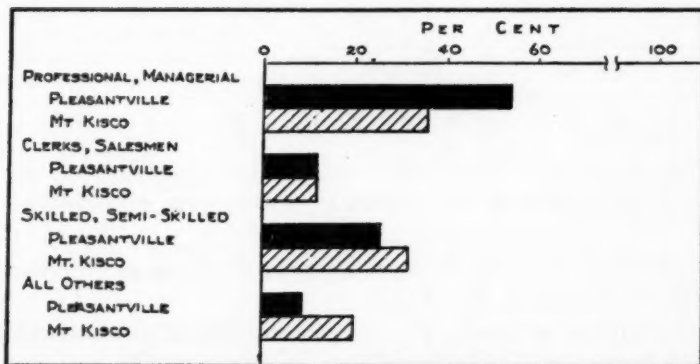


Fig. 2. Distribution of household heads according to occupational class, Pleasantville and Mt. Kisco.

tributed according to occupational class (3).² Here again there are marked differences between the two communities. Fifty-four per cent of the household heads in Pleasantville were in the professional or managerial class compared with 36 per cent in Mt. Kisco. Twelve per cent in each community were in the class "clerks and salesmen." The household heads whose occupation was classed as "skilled, semi-skilled, or unskilled (all other)" formed a higher proportion of the total in Mt. Kisco than was true of Pleasantville.

Pleasantville and Mt. Kisco are suburban communities which are not entirely self-maintained, that is, they do not afford employment for their total employed population. Consequently, there is a flow of employed persons out of the community and back into the community each working day. It is possible to classify the families in each community according to whether one or more members worked outside the community.

Table 5 shows the families in Pleasantville and Mt. Kisco classified according to commuter status. It is apparent that the two communities differ markedly with respect to the proportion classed as commuter families. In Pleasantville 76 per cent of

² Coding of occupational class was based upon the Alphabetical Index of Occupations and Industries—Sixteenth Census of the United States: 1940. U. S. Department of Commerce, Bureau of the Census.

CLASSIFICATION OF FAMILIES	PER CENT OF FAMILIES	STATUS OF FAMILY	
		COMMUTER	NON-COMMUTER
Pleasantville	100.0	75.9	24.1
Mt. Kisco	100.0	53.3	46.7

Table 5. Families classified according to commuter status in Pleasantville and Mt. Kisco.

the families had one or more commuters in them compared with 53 per cent in Mt. Kisco.

To summarize briefly, the two communities were comparable with respect to (1) the loss of families due to moving or refusal to cooperate; (2) age distribution of the family members; (3) age of husbands and wives; and (4) size of family. There were, however, marked differences between the two communities in the educational attainment of husbands and wives, in the occupational class, and in commuter status of the family.

It will be necessary to find out whether differences in occupational class and commuter status of the family do affect the illness rates in the two communities.

Table 6. Incidence of acute respiratory illness, September-May.

School Year and Community	All Ages	School-Age Children 5-18 Years
	Rate Per 1,000 Population	
<i>1946-1947</i>		
Pleasantville	1,446	2,007
Mt. Kisco	1,297	1,682
<i>1947-1948</i>		
Pleasantville	1,405	1,827
Mt. Kisco	1,298	1,671
<i>1948-1949</i>		
Pleasantville	1,449	1,972
Mt. Kisco	1,398	1,779

INCIDENCE OF MINOR RESPIRATORY ILLNESS

The incidence of acute respiratory illness for persons of all ages and for those of school age is shown in Table 6 for Pleasantville and Mt. Kisco in each of the three study years. In each year and in both age groups the incidence of reported illness was somewhat higher in Pleasantville than in Mt. Kisco.

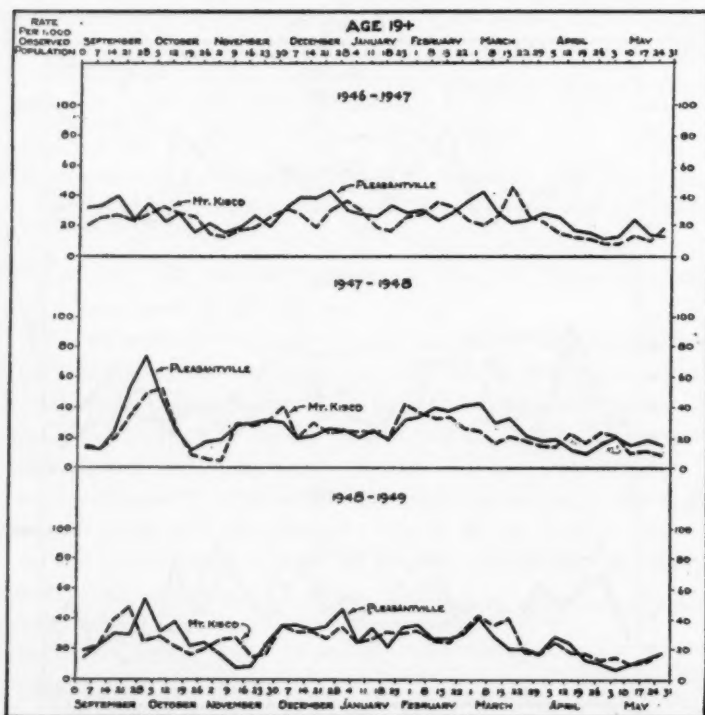


Fig. 4. Weekly incidence of acute respiratory illness among persons aged 19 and over in Pleasantville and Mt. Kisco, September-May, 1946-1947, 1947-1948, and 1948-1949. (Pleasantville protected by ultra-violet lights in the schools.)

From these data there appear to have been what may be termed as four epidemic periods, that is, periods of relatively high incidence of acute respiratory illness. One period in September, the second in November, the third in the latter part of January and February, and the fourth in April or May. These rates are based upon observation of about 900 children observed in each week in each community. Consequently, the fluctuations in the weekly rates cannot be attributed to the influence of small numbers.

Figure 4 shows the same type of data for persons aged 19 and over in the two communities. The weekly incidence in each

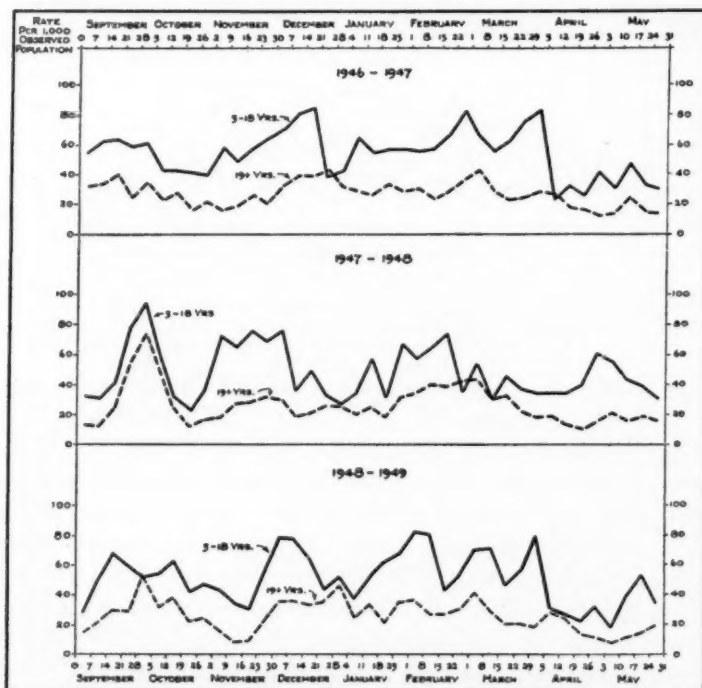


Fig. 5. Comparison of the weekly incidence of acute respiratory illness among children aged 5-18 and adults 19 years and older in each school year in Pleasantville.

year was fairly similar in both communities. In the second year, during the last week of September and the first week of October, the incidence of acute respiratory illness was relatively high among adults, just as it was among school-age children. However, with that exception, there were no particularly marked variations in the level of the rates week by week as was true of the school-age children.

There were about 180 to 200 preschool-aged children in the families in each community. Because of the small numbers, the illness experience of these children during the three school years—9, 1946 to 5, 1948—has been combined. Figure 5 presents a

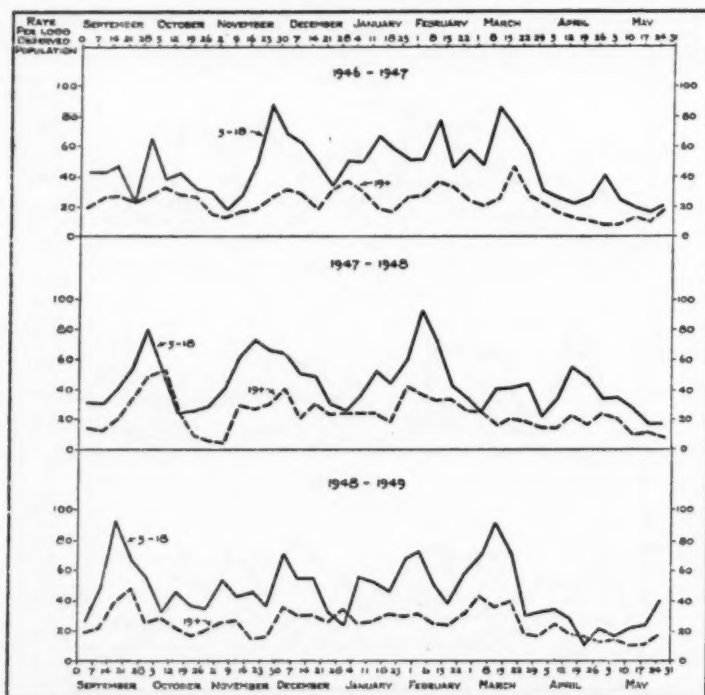


Fig. 6. Comparison of the weekly incidence of acute respiratory illness among children aged 5-18 and adults 19 years and older in each school year in Mt. Kisco.

comparison of the weekly incidence of acute respiratory illness in the two communities. In both communities the incidence was highest in September, November, and early December. The rates of illness were also relatively high during the last week of January and during February and March. Considering the small numbers of children aged 0-4, the weekly incidence in the two communities showed considerable similarity.

Figures 6 and 7 show a comparison of the weekly incidence of acute respiratory illness among school-age children and adults in Pleasantville and Mt. Kisco, respectively, in each school year. In both communities school-age children had an incidence of illness considerably higher than that of persons

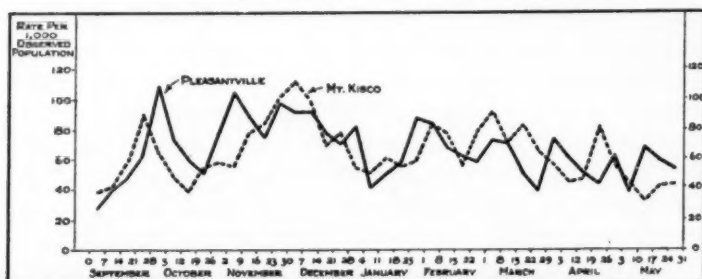


Fig. 7. Weekly incidence of acute respiratory illness among children aged 0-4 years in Pleasantville and Mt. Kisco, September-May. Data for three school years are combined, 1946-1947, 1947-1948, and 1948-1949.

aged 19 or older. This fact corresponds with data from other studies of morbidity. Aside from differences in the level of weekly incidence, the most interesting point brought out by these charts is the suggestion that in each school year the peak of incidence of illness among adults is about one week later than the peak of incidence among school-age children. This was true of both communities with the exception of the September outbreak of respiratory illness in Pleasantville in the school year 1947-1948. In that instance, at both ages, the incidence was highest during the week September 29 to October 5.

INCIDENCE OF INTESTINAL INFLUENZA

On each visit to the family, inquiry was made concerning the occurrence of intestinal influenza or grippe among the family members. These illnesses usually have digestive manifestations without respiratory symptoms and were sometimes reported as virus X or virus infection of the intestines. In the two populations studied, such illnesses occurred much less frequently than did minor respiratory illness. For this reason the data of the three school years have been combined. Figure 8 shows the weekly incidence in Pleasantville and Mt. Kisco. The most striking point brought out by Figure 8 is that intestinal influenza or grippe had a seasonal incidence which was generally similar in the two communities and was unlike the seasonal incidence noted for minor respiratory illness. The

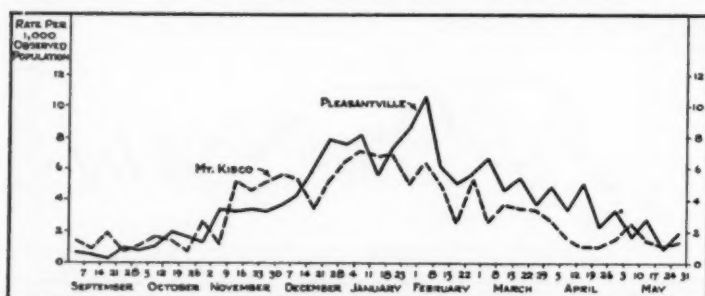


Fig. 8. Weekly incidence of intestinal influenza or grippe in Pleasantville and Mt. Kisco, September-May. Data for three school years are combined, 1946-1947, 1947-1948, and 1948-1949.

incidence rose gradually during the fall, reached its peak during the winter months, and then declined gradually to about the same level as was recorded during the fall months. It seems reasonable to conclude that these data offer an indication that illnesses specified as intestinal influenza or grippe differ epidemiologically from minor respiratory illnesses.

Table 7. Incidence of illness by occupational class.

Occupational Class By Year	Pleasantville	Mt. Kisco
	Rate Per 1,000	
<i>Professional</i>		
1946-1947	1,654	1,619
1947-1948	1,694	1,655
1948-1949	1,735	1,640
<i>Clerks, Skilled</i>		
1946-1947	1,394	1,351
1947-1948	1,200	1,251
1948-1949	1,304	1,428
<i>Semiskilled, Other</i>		
1946-1947	1,086	1,034
1947-1948	1,017	1,032
1948-1949	942	1,157

ILLNESS BY OCCUPATIONAL CLASS OF FAMILY

Illness in each family was coded according to the occupational class of the head of the family. Consequently, it is possible to evaluate the influence of this factor on the incidence of illness. Table 7 shows the rates for persons of all ages in the families in each community classified according to three occupational classes: (1) professional and managerial; (2) clerks,

salesmen, and skilled workers; and (3) semi-skilled workers, unskilled, and domestics. The most striking point brought out by the table is that the higher the occupational class, the higher was the incidence of acute respiratory illness. This was true of both communities. Also the rates for the two communities, specific for occupational class of the household head, are much more similar than the total rates were without consideration of this particular classification. The same general pattern was evident when the data were classified according to age. It should be added that the distribution of the population by age is similar in each of the three family groups.

This table shows very definitely the influence of a subjective factor, family attitude toward illness, which may affect reported attacks. There is no good reason to believe that acute respiratory illness is selective of persons in one particular social class compared with another. If that be true, it must be concluded that what is considered as illness in one family is not necessarily considered so in another family.

It will be remembered that the proportion of families where the household head was in the "professional and managerial" occupational class was considerably higher in Pleasantville than in Mt. Kisco, and that the latter community was somewhat weighted with those in the "unskilled labor" class. This may be the reason why rates of illness in Pleasantville were consistently higher than those in Mt. Kisco.

The families in Pleasantville and Mt. Kisco differed also with respect to commuter status of the family. Table 8, which shows the families in the two communities classified according to occupational class and commuter status, indicates quite clearly that commuters were distributed similarly among the occupational classes in Pleasantville and in Mt. Kisco although they formed different proportions in each community. For example, families with one or more commuters formed about 76 per cent in each occupational class in Pleasantville; in Mt. Kisco these families constituted from 49 to 58 per cent of the total in each class.

OCCUPATIONAL CLASS	TOTAL	COMMUTER STATUS	
		Commuter	Non-Commuter
		Per Cent	
<i>Pleasantville</i>			
Professional and Managerial	100.0	75.6	24.4
Clerical and Skilled Workers	100.0	76.9	23.1
Semi-Skilled and Unskilled Workers	100.0	75.2	24.8
<i>Mt. Kisco</i>			
Professional and Managerial	100.0	49.3	50.7
Clerical and Skilled Workers	100.0	58.4	41.6
Semi-Skilled and Unskilled Workers	100.0	52.7	47.3

Table 8. Families classified according to commuter status and occupational class of head of household, Pleasantville and Mt. Kisco.

From the data presented in Tables 7 and 8, it appears that occupational class of the family is an important factor in determining the illness rate of the family and the implications are that commuter status of the family has little or no effect upon the illness rate.

From the data of acute respiratory illness observed in families during three school years in Pleasantville and Mt. Kisco (September, 1946-May, 1949) it is apparent that the introduction of ultra-violet lights in the Pleasantville schools and other places where children congregate did not affect the illness rates. Also, there was no evidence that the seasonal or weekly incidence of such illness among school-age children was affected in any way. In fact, the two communities were strikingly similar in this respect.

DISCUSSION

Surveys of morbidity have shown that slightly more than 40 per cent of all illness (annually) is due to acute respiratory diseases (4, 5). The "common cold," which is the acute respiratory disease most frequent in occurrence, is considered the most highly infectious of the communicable diseases. Furthermore, these diseases cause a great deal of disability. In a study of illness in the Eastern Health District of Baltimore, 43 per cent of

the respiratory illnesses among males and 38 per cent among females caused interference with usual work or activities (6). In fact, among employed persons, acute respiratory illnesses accounted for 42 per cent of the days lost from work because of illness. Because these diseases are ubiquitous and are costly in terms of personal discomfort and disability, careful research is being done by many investigators to determine their etiology and epidemiology. The ultimate objective of this research is prevention and control of the acute respiratory infections.

In some instances, measures of prevention of a disease have preceded complete knowledge of its etiology. Consequently, careful research is also being done in the form of experiments in the control of respiratory diseases. Knowledge of the etiology of two types of influenza, A and B, has made it possible to produce a vaccine against these types. Studies have been and are being conducted to determine the effectiveness of the vaccine as a prophylactic measure during and before an expected influenza epidemic (7, 8, 9).

In 1934 and in the following years, Wells established the facts (1) that the air of enclosed spaces may become heavily contaminated with a number of pathogenic microorganisms, and (2) that certain specific infections may be transmitted to experimental animals by the aerial route (10, 11). These facts have led to experimentation in the control of airborne infection by means of mechanical ventilation, ultra-violet irradiation, disinfectant vapors, such as triethylene glycol, and dust suppression.

The results of experimentation with ultra-violet irradiation in preventing transfer of infection in strictly controlled environments, such as infant and children's wards in hospitals, have been summarized by the Sub-committee on Air Sanitation of the American Public Health Association as follows: "The sum total of evidence, in infant wards, seems to be that when strict aseptic conditions are maintained, ultra-violet irradiation further reduces the frequency of cross-infection." (12)

Carefully controlled studies, conducted during the period

1943-1947 among recruits at United States Naval Training Centers (Camp Sampson, New York, and Great Lakes), have indicated that ultra-violet irradiation of barracks resulted in a reduction of about 20 per cent in the rate of admissions to sick-bay because of respiratory illness (13, 14). It was pointed out that "the degree to which airborne infection is an important mode of spread of acute respiratory diseases is unknown." However, the results were considered to be sufficiently promising to warrant a continuing program of field research, though not sufficiently promising to warrant more general use of ultra-violet light as a means of control.

Another study of ultra-violet irradiation was conducted in the population of an institution for delinquent boys aged 14-17 in Washington, D. C. This investigation was carried on from July, 1941, to June, 1947. The upper air in two of the four dormitories for white boys was irradiated for 12 hours daily, floor radiation was added in 1944, and the hours were extended to 24. The other two dormitories with no irradiation served as controls. The population of each dormitory varied from 45 to about 70. Hospital admission, based chiefly on the presence of fever, was the criterion of illness. The authors of the report on this study found that the incidence of respiratory illness among the boys in the irradiated dormitories was sometimes higher, sometimes lower, than that of the control dormitories, with no evidence that ultra-violet radiation consistently effected a reduction in disease incidence (15, 16). The small population studied made the general results somewhat indeterminate.

The approach in the study in Westchester County was that of a field investigation in epidemiology. The study embraced the entire school-child population and their families in two different communities. It was confined to the observation of acute respiratory illnesses as they occur in groups of people of various ages under natural conditions.

One of the well-established facts in this field of epidemiology is that the frequency of acute respiratory illness is highest in children under 5, declines progressively until the young adult

ages when a slight increase occurs, and thereafter declines regularly as age increases. The school class room has been presumed to furnish an environment conducive to the spread of respiratory illness because it brings together in fairly close contact groups with a relatively high susceptibility to such illness. Furthermore, the school offers the closest and most constant community contact which the child 5 to 18 years of age experiences outside of the family unit.

The use of ultra-violet irradiation as a method of air sanitation in the schools of Pleasantville and other places in the community where children congregate was based upon the hypothesis that a substantial proportion of the respiratory infections may be spread by the airborne route and their dissemination can be controlled by this means. However, a comparison of the illness rates of acute respiratory diseases among school-age children in Pleasantville with those in Mt. Kisco, the control community, indicated no effect from ultra-violet irradiation. The weekly incidence of such illness was strikingly similar in the two communities. The periods of high incidence also were similar in the two communities and were not confined to open-window seasons when air sanitation by ultra-violet light is less effective than during cold-weather seasons when open-window ventilation is at a minimum.

It may be concluded that this study has shown that acute respiratory illness in the two communities followed a similar epidemiological pattern regardless of the use of ultra-violet light in one community.

Acknowledgments are made to Dr. Mildred W. Wells and to the Westchester County Department of Health for generous assistance and cooperation which greatly facilitated the study of acute respiratory illness.

An especial acknowledgment is made to the families in Pleasantville and Mt. Kisco who participated in the study.

Miss Sally Preas, formerly of the Milbank Memorial Fund, assisted

in the organization of the study and in the training of the family visitors.

The members of the field staff in Pleasantville were: Miss Anne Sage Hubbell, supervisor, Misses Katherine Simon, Martha Perkins, and Jane E. Coulter.

In Mt. Kisco: Mrs. Frances Conn, supervisor, Mrs. Marguerite Keller, Misses Virginia Boggs, and Grace Strangio.

Miss Jeanne Clare and Mrs. Arolyn Conwill assisted in both Mt. Kisco and Pleasantville.

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Appendix Table 1. Distribution of household heads and wives according to highest education attained, Pleasantville and Mt. Kisco, 1947-1948.¹

EDUCATION COMPLETED	HEADS OF HOUSEHOLDS		WIVES	
	Pleasantville	Mt. Kisco	Pleasantville	Mt. Kisco
	Per Cent			
TOTAL	100.0	100.0	100.0	100.0
College	39.8	15.4	27.0	10.0
High School	31.1	41.9	46.9	51.5
Grade School	27.4	39.5	24.7	36.4
No School	1.7	3.2	1.4	2.1
Number of Heads of the Households ²	464	494	429	470

¹ Includes families observed 30 weeks or longer, September, 1947-June, 1948.

² Excludes unknowns.

Appendix Table 2. Occupations of the heads of households in Pleasantville and Mt. Kisco, 1947-1948.¹

OCCUPATIONAL CLASS	PLEASANTVILLE	MT. KISCO
	Per Cent	
TOTAL	100.0	100.0
Professional, Managerial	54.0	35.8
Clerks, Salesmen	11.6	11.9
Skilled, Semiskilled	25.7	32.4
All Other	8.7	19.9
Number of Heads of the Households ²	439	469

¹ Includes families observed 30 weeks or longer, September, 1947-June, 1948.

² Excludes those not employed.

Appendix Table 3. Weekly incidence of acute respiratory illness by age and school year in Pleasantville, September, 1946-May, 1949.

WEEK	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19+	0-4	5-18	19+	0-4	5-18	19+
	Rates Per 1,000 Observed Population								
<i>September</i>									
1-7	17.5	55.4	32.3	34.0	31.7	13.4	30.8	28.3	15.2
8-14	72.6	61.8	33.7	25.8	30.7	12.1	27.8	51.1	22.2
15-21	62.0	63.3	39.5	18.9	40.8	24.8	66.7	68.3	29.9
22-28	41.1	58.8	23.7	54.2	79.5	54.2	89.8	59.6	28.7
29-Oct. 5	95.2	60.9	34.9	180.7	95.3	73.9	55.6	52.2	53.5
<i>October</i>									
6-12	93.3	43.4	23.4	53.3	56.7	46.8	77.8	54.6	30.8
13-19	72.8	43.3	27.5	70.6	30.5	23.9	38.9	63.3	37.8
20-26	65.4	42.2	16.4	35.3	23.4	12.1	54.3	41.7	22.2
27-Nov. 2	45.7	39.8	22.4	88.2	38.1	17.2	97.8	46.7	24.0
<i>November</i>									
3-9	83.3	57.5	16.2	126.4	71.7	19.0	102.7	43.0	16.0
10-16	63.3	48.9	18.8	120.0	65.3	27.5	81.1	34.1	8.0
17-23	76.4	57.9	26.7	84.7	76.2	29.0	64.5	30.4	8.9
24-30	70.1	65.0	19.7	108.0	68.8	32.3	112.3	54.0	21.8
<i>December</i>									
1-7	69.6	70.9	33.2	79.1	75.7	29.8	122.3	79.2	35.7
8-14	101.3	80.8	39.1	62.1	34.6	18.7	111.7	78.3	35.8
15-21	104.3	84.7	38.8	78.7	49.3	21.2	53.2	64.0	33.3
22-28	73.6	39.1	42.8	55.6	33.2	26.3	79.8	43.4	35.3
29-Jan. 4	103.0	43.8	30.5	97.8	26.6	25.3	47.6	51.7	45.9
<i>January</i>									
5-11	41.9	65.0	28.0	32.6	34.1	20.3	47.6	36.9	24.0
12-18	79.8	55.1	27.2	16.5	56.5	24.9	57.3	53.3	33.6
19-25	42.9	56.6	34.2	49.7	31.1	18.2	78.5	62.4	20.5
26-Feb. 1	98.2	56.6	29.0	66.3	67.2	32.0	99.5	67.5	34.7
<i>February</i>									
2-8	78.3	56.3	31.4	38.3	56.8	33.6	136.8	81.9	36.0
9-15	59.5	57.6	23.7	69.5	64.9	40.2	73.7	79.6	27.1
16-22	46.8	67.2	28.8	85.6	72.6	38.3	51.5	41.1	27.2
23-Mar. 1	57.8	83.4	37.2	54.1	34.4	41.7	61.9	53.6	29.9
<i>March</i>									
2-8	126.4	65.5	42.7	28.9	54.0	42.7	70.0	70.1	40.7
9-15	34.1	54.6	29.1	64.2	30.5	29.7	111.1	71.4	28.5
16-22	39.5	68.2	23.1	52.9	45.0	33.1	56.1	45.8	19.7
23-29	52.0	76.7	24.9	26.6	37.4	22.1	40.6	57.1	19.7
30-Apr. 5	86.7	83.0	29.4	69.9	34.0	17.9	66.0	79.0	17.9
<i>April</i>									
6-12	79.5	24.3	27.3	69.5	34.0	18.7	35.4	29.5	27.7
13-19	28.1	32.8	18.1	48.6	34.4	13.0	71.8	26.0	24.1
20-26	28.1	25.5	16.3	54.9	39.7	9.6	44.8	21.7	13.3
27-May 3	33.7	41.3	12.0	104.4	60.7	15.6	49.8	31.9	10.7
<i>May</i>									
4-10	16.9	30.8	13.8	82.4	54.5	20.9	15.1	18.1	7.2
11-17	118.0	47.7	24.8	43.5	43.1	15.7	45.9	38.4	10.8
18-24	67.4	34.2	14.6	60.4	39.2	19.1	50.8	53.4	14.3
25-31	37.0	30.5	14.0	60.4	30.8	15.7	56.4	34.3	18.8

Appendix Table 4. Number of cases of acute respiratory illness by week of onset in each school year in Pleasantville, September, 1946-May, 1949.

WEEKS	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19 +	0-4	5-18	19 +	0-4	5-18	19 +
<i>September</i>									
1-7	2	41	33	5	24	14	4	20	15
8-14	9	47	36	4	24	13	4	38	23
15-21	8	49	43	3	32	27	10	51	31
22-28	6	47	27	9	63	60	15	46	31
29-Oct. 5	14	49	40	30	77	85	10	41	59
<i>October</i>									
6-12	14	35	27	9	46	54	14	43	34
13-19	11	35	32	12	25	28	7	50	42
20-26	10	34	19	6	19	14	10	33	25
27-Nov. 2	7	32	26	15	31	20	18	37	27
<i>November</i>									
3-9	13	47	19	22	58	22	19	34	18
10-16	10	40	22	21	53	32	15	27	9
17-23	12	47	31	15	62	34	12	24	10
24-30	11	53	23	19	56	38	21	43	25
<i>December</i>									
1-7	11	58	39	14	61	35	23	62	40
8-14	16	66	46	11	28	22	21	61	40
15-21	17	70	46	14	40	25	10	51	38
22-28	12	32	50	10	27	31	15	35	41
29-Jan. 4	17	36	36	18	22	30	9	41	52
<i>January</i>									
5-11	7	53	33	6	28	24	9	29	27
12-18	13	45	32	3	46	29	11	42	38
19-25	7	46	40	9	25	21	15	49	23
26-Feb. 1	16	46	34	12	54	37	19	53	39
<i>February</i>									
2-8	13	46	37	7	46	39	26	64	40
9-15	10	47	28	13	53	47	14	62	30
16-22	8	55	34	16	59	45	10	32	30
23-Mar. 1	10	69	44	10	28	49	12	42	33
<i>March</i>									
2-8	22	54	50	5	44	50	14	55	46
9-15	6	45	34	12	25	35	22	56	32
16-22	7	52	27	10	37	39	11	36	22
23-29	9	63	29	5	31	26	8	45	22
30-Apr. 5	15	68	34	13	28	21	13	62	20
<i>April</i>									
6-12	14	20	32	13	28	22	7	23	31
13-19	5	27	21	9	28	15	14	20	27
20-26	5	21	19	10	32	11	9	17	15
27-May 3	6	34	14	19	49	18	10	25	12
<i>May</i>									
4-10	3	25	16	15	44	24	3	14	8
11-17	21	39	29	8	35	18	9	30	12
18-24	12	28	17	11	32	22	10	42	16
25-31	5	18	12	11	25	18	11	27	21

Appendix Table 5. Population by age observed in each week and school year in Pleasantville, September, 1946-May, 1949.

WEEKS	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19 +	0-4	5-18	19 +	0-4	5-18	19 +
<i>September</i>									
1- 7	114	740	1,021	117	757	1,045	130	707	987
8-14	124	761	1,067	155	782	1,074	144	744	1,036
15-21	129	774	1,089	159	785	1,090	150	747	1,036
22-28	146	800	1,138	166	792	1,108	167	772	1,081
29-Oct. 5	147	805	1,145	166	808	1,150	180	785	1,102
<i>October</i>									
6-12	150	806	1,156	169	812	1,154	180	788	1,105
13-19	151	809	1,162	170	819	1,171	180	790	1,112
20-26	153	805	1,159	170	813	1,160	184	792	1,125
27-Nov. 2	153	805	1,159	170	813	1,160	184	792	1,125
<i>November</i>									
3- 9	156	818	1,171	174	809	1,159	185	791	1,127
10-16	158	818	1,170	175	812	1,165	185	792	1,128
17-23	157	812	1,161	177	814	1,172	186	790	1,127
24-30	157	815	1,165	176	814	1,175	187	796	1,145
<i>December</i>									
1- 7	158	818	1,176	177	806	1,176	188	783	1,121
8-14	158	817	1,176	177	810	1,175	188	779	1,118
15-21	163	826	1,187	178	811	1,178	188	797	1,140
22-28	163	819	1,168	180	814	1,180	188	807	1,160
29-Jan. 4	165	822	1,180	184	828	1,185	189	793	1,132
<i>January</i>									
5-11	167	815	1,179	184	820	1,181	189	786	1,127
12-18	163	817	1,178	182	814	1,164	192	788	1,130
19-25	163	813	1,171	181	804	1,155	191	785	1,124
26-Feb. 1	163	813	1,171	181	804	1,155	191	785	1,124
<i>February</i>									
2- 8	166	817	1,180	183	810	1,159	190	781	1,110
9-15	168	816	1,181	187	817	1,170	190	779	1,107
16-22	171	819	1,180	187	813	1,176	194	778	1,101
23-Mar. 1	173	827	1,183	185	813	1,175	194	783	1,104
<i>March</i>									
2- 8	174	825	1,172	186	815	1,170	200	785	1,130
9-15	176	824	1,170	187	819	1,177	198	784	1,122
16-22	177	823	1,167	189	823	1,178	196	786	1,119
23-29	173	821	1,164	188	828	1,176	197	788	1,117
30-Apr. 5	173	819	1,156	186	824	1,173	197	785	1,118
<i>April</i>									
6-12	176	824	1,172	187	824	1,179	198	780	1,118
13-19	178	822	1,163	185	814	1,157	195	788	1,122
20-26	178	824	1,168	182	807	1,151	201	783	1,125
27-May 3	178	824	1,168	182	807	1,151	201	783	1,125
<i>May</i>									
4-10	178	813	1,160	182	808	1,147	199	775	1,110
11-17	178	817	1,168	184	812	1,146	196	782	1,113
18-24	178	818	1,167	182	817	1,151	197	786	1,121
25-31	135	591	856	182	812	1,143	195	788	1,117

Appendix Table 6. Weekly incidence of acute respiratory illness by age and school year in Mt. Kisco, September, 1946-May, 1949.

WEEKS	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19 +	0-4	5-18	19 +	0-4	5-18	19 +
Rates Per 1,000 Observed Population									
<i>September</i>									
1- 7	71.4	42.6	20.4	20.1	31.0	13.9	32.1	26.9	18.6
8-14	70.4	43.2	26.3	17.1	30.4	11.7	43.8	48.2	21.5
15-21	73.8	47.1	26.5	16.0	39.6	20.0	90.9	92.3	38.9
22-28	64.1	22.8	22.7	92.8	54.3	35.2	111.7	65.7	47.8
29-Oct. 5	50.6	65.2	26.7	40.8	78.7	48.7	97.6	54.5	24.6
<i>October</i>									
6-12	68.8	38.0	33.3	30.5	48.6	53.4	48.8	31.9	27.5
13-19	37.5	42.1	27.8	20.3	23.8	26.3	58.5	45.6	21.5
20-26	68.3	32.1	26.1	35.2	25.1	9.3	63.4	37.3	15.6
27-Nov. 2	43.5	29.9	15.2	45.2	28.4	6.2	82.9	35.1	20.1
<i>November</i>									
3- 9	18.4	18.8	12.5	35.0	41.3	5.4	103.4	53.5	26.3
10-16	49.1	27.5	16.6	90.5	62.0	28.6	88.7	43.1	26.5
17-23	97.6	49.9	19.3	94.5	72.5	26.9	64.0	46.3	15.2
24-30	61.0	88.5	26.0	156.6	65.6	30.1	80.4	36.3	16.5
<i>December</i>									
1- 7	108.4	68.6	31.8	90.0	63.6	40.7	136.4	71.1	36.1
8-14	98.4	61.6	28.2	74.6	51.2	19.8	126.3	54.7	30.9
15-21	73.2	47.8	19.0	69.7	48.7	29.6	64.4	55.0	30.5
22-28	97.6	33.8	30.5	65.7	29.9	23.0	73.9	31.7	25.9
29-Jan. 4	41.7	51.1	37.1	34.5	25.5	24.3	84.2	24.4	35.3
<i>January</i>									
5-11	41.4	50.4	29.8	50.0	36.1	24.4	59.1	55.6	24.9
12-18	64.7	66.7	19.0	45.2	53.1	23.7	73.5	52.4	27.2
19-25	69.0	59.1	17.4	49.5	44.4	19.1	49.3	46.0	31.8
26-Feb. 1	69.0	51.4	27.3	54.5	60.2	42.7	54.2	67.5	30.3
<i>February</i>									
2- 8	81.4	51.8	28.1	77.7	92.5	37.2	93.6	72.6	32.3
9-15	63.6	77.9	37.2	87.4	71.9	33.4	78.8	50.3	24.9
16-22	44.9	46.2	32.9	62.5	43.4	33.6	55.6	37.6	23.5
23-Mar. 1	60.8	58.4	23.9	48.3	34.9	26.0	131.3	59.0	33.4
<i>March</i>									
2- 8	87.0	48.1	21.4	58.0	24.5	25.2	132.7	69.6	43.3
9-15	85.6	87.0	26.8	38.5	41.4	16.0	90.5	91.9	36.1
16-22	133.7	74.4	47.2	52.1	42.4	21.3	68.3	74.3	39.8
23-29	77.3	56.5	26.6	52.1	44.5	18.2	68.0	80.7	17.9
30-Apr. 5	51.3	30.5	23.4	69.4	22.1	15.1	47.6	32.8	17.1
<i>April</i>									
6-12	30.8	26.2	16.1	36.2	34.6	15.1	66.7	35.1	25.4
13-19	30.9	23.0	13.0	36.0	55.6	23.4	72.5	28.9	18.0
20-26	87.6	27.4	12.2	103.6	48.2	16.6	53.4	10.7	16.6
27-May 3	72.2	41.6	8.9	58.6	33.5	24.2	38.8	22.4	12.9
<i>May</i>									
4-10	31.1	26.3	9.0	73.1	34.6	20.5	23.9	17.1	15.1
11-17	36.6	20.6	13.8	18.1	28.2	9.8	43.3	22.5	10.7
18-24	31.4	18.4	11.4	36.4	17.7	12.1	57.4	24.7	12.2
25-31	53.0	21.9	19.0	9.2	17.8	9.1	71.1	40.7	18.2

Appendix Table 7. Number of cases of acute respiratory illness by week of onset in each school year in Mt. Kisco, September, 1946-May, 1949.

WEEKS	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19 +	0-4	5-18	19 +	0-4	5-18	19 +
<i>September</i>									
1-7	9	36	22	3	27	16	5	23	22
8-14	10	37	29	3	27	14	7	42	26
15-21	11	41	30	3	36	25	16	33	49
22-28	10	20	26	13	50	45	21	60	62
29-Oct. 5	8	58	31	8	73	63	20	51	33
<i>October</i>									
6-12	11	34	39	6	45	69	10	30	37
13-19	6	38	33	4	22	34	12	43	29
20-26	11	29	31	7	23	12	13	35	21
27-Nov. 2	7	27	18	9	26	8	17	33	27
<i>November</i>									
3-9	3	17	15	7	38	7	21	50	35
10-16	8	25	20	18	57	37	18	40	35
17-23	16	45	23	19	67	35	13	43	20
24-30	10	80	31	31	61	39	16	34	22
<i>December</i>									
1-7	18	62	38	18	59	53	27	66	48
8-14	16	56	34	15	48	26	25	51	41
15-21	12	44	23	14	46	39	13	52	41
22-28	16	31	37	13	23	30	15	30	35
29-Jan. 4	7	47	45	7	24	32	17	23	47
<i>January</i>									
5-11	7	46	36	10	34	32	12	52	33
12-18	11	61	23	9	50	31	15	49	36
19-25	12	54	21	10	42	25	10	43	42
26-Feb. 1	12	47	33	11	57	56	11	63	40
<i>February</i>									
2-8	14	47	34	16	68	49	19	68	43
9-15	11	71	45	18	68	44	16	47	33
16-22	8	42	40	13	41	44	11	35	31
23-Mar. 1	11	53	29	10	33	34	26	55	44
<i>March</i>									
2-8	16	44	26	12	23	33	26	65	57
9-15	16	80	33	8	39	21	18	86	48
16-22	25	68	58	11	40	28	14	70	53
23-29	15	52	33	11	42	24	14	29	24
30-Apr. 5	10	28	29	15	21	20	10	31	23
<i>April</i>									
6-12	6	24	20	8	33	20	14	33	34
13-19	6	21	16	8	53	31	15	27	24
20-26	17	25	15	23	46	22	11	10	22
27-May 3	14	38	11	13	32	32	8	21	17
<i>May</i>									
4-10	6	24	11	16	33	27	5	16	20
11-17	7	19	17	4	27	13	9	21	14
18-24	6	17	14	8	17	16	12	23	16
25-31	8	15	18	2	17	12	15	38	24

Appendix Table 8. Population by age observed in each week, and school year in Mt. Kisco, September, 1946-May, 1949.

WEEKS	1946-1947			1947-1948			1948-1949		
	Age Group			Age Group			Age Group		
	0-4	5-18	19 +	0-4	5-18	19 +	0-4	5-18	19 +
<i>September</i>									
1-7	126	846	1,077	140	870	1,153	156	856	1,183
8-14	142	857	1,104	175	888	1,197	160	872	1,211
15-21	149	870	1,131	187	910	1,249	178	899	1,259
22-28	156	877	1,146	194	920	1,280	188	913	1,298
29-Oct. 5	158	889	1,160	196	927	1,294	205	936	1,339
<i>October</i>									
6-12	160	894	1,170	197	926	1,291	205	941	1,347
13-19	160	903	1,185	197	924	1,294	205	942	1,349
20-26	161	903	1,187	199	916	1,294	205	939	1,346
27-Nov. 2	161	903	1,187	199	916	1,294	205	939	1,346
<i>November</i>									
3-9	163	905	1,197	200	919	1,289	203	934	1,332
10-16	163	909	1,202	199	920	1,294	203	927	1,323
17-23	164	902	1,192	201	924	1,299	203	929	1,318
24-30	164	904	1,194	198	930	1,296	199	937	1,337
<i>December</i>									
1-7	166	904	1,194	200	927	1,301	198	928	1,328
8-14	166	909	1,205	201	938	1,311	198	933	1,325
15-21	164	920	1,213	201	945	1,317	202	945	1,345
22-28	164	917	1,212	198	936	1,307	203	947	1,351
29-Jan. 4	168	919	1,213	203	943	1,317	202	941	1,333
<i>January</i>									
5-11	169	913	1,207	200	943	1,314	203	935	1,324
12-18	170	915	1,209	199	941	1,307	204	935	1,322
19-25	174	914	1,208	202	947	1,311	203	934	1,321
26-Feb. 1	174	914	1,208	202	947	1,311	203	934	1,321
<i>February</i>									
2-8	172	908	1,204	206	951	1,318	203	937	1,331
9-15	173	911	1,210	206	946	1,318	203	934	1,324
16-22	178	910	1,214	208	944	1,310	198	930	1,318
23-Mar. 1	181	908	1,211	207	945	1,310	198	932	1,317
<i>March</i>									
2-8	184	915	1,215	207	939	1,311	196	934	1,317
9-15	187	920	1,230	208	942	1,313	199	936	1,329
16-22	187	914	1,228	211	943	1,314	205	942	1,333
23-29	194	920	1,239	211	943	1,318	206	945	1,342
30-Apr. 5	195	919	1,238	216	951	1,324	210	945	1,347
<i>April</i>									
6-12	195	916	1,239	221	953	1,325	210	939	1,338
13-19	194	912	1,230	222	953	1,323	207	935	1,332
20-26	194	914	1,234	222	954	1,325	206	937	1,322
27-May 3	194	914	1,234	222	954	1,325	206	937	1,322
<i>May</i>									
4-10	193	914	1,227	219	955	1,317	209	936	1,321
11-17	191	921	1,230	221	956	1,320	208	933	1,311
18-24	191	925	1,230	220	959	1,320	209	933	1,316
25-31	151	684	949	218	957	1,320	211	934	1,316

Appendix Table 9. Weekly incidence of acute respiratory illness among children 0-4 years of age, Pleasantville and Mt. Kisco, 1946-1949.

WEEKS	Rates Per 1,000 Population	
	Pleasantville	Mt. Kisco
<i>September</i>		
1-7	28.1	39.4
8-14	40.2	41.9
15-21	47.9	58.6
22-28	62.6	91.1
29-Oct. 5	109.5	64.4
<i>October</i>		
6-12	74.1	48.0
13-19	59.9	39.1
20-26	51.3	54.9
27-Nov. 2	78.9	58.4
<i>November</i>		
3-9	104.9	54.8
10-16	88.8	77.9
17-23	75.0	84.5
24-30	98.1	101.6
<i>December</i>		
1-7	91.8	111.7
8-14	91.8	99.1
15-21	77.5	68.8
22-28	69.7	77.9
29-Jan. 4	81.8	54.1
<i>January</i>		
5-11	40.7	50.7
12-18	50.3	61.1
19-25	57.9	55.3
26-Feb. 1	87.9	58.7
<i>February</i>		
2-8	85.3	84.3
9-15	67.9	77.3
16-22	61.6	54.8
23-Mar. 1	58.0	80.2
<i>March</i>		
2-8	73.2	92.0
9-15	71.3	70.7
16-22	49.8	82.9
23-29	39.4	65.5
30-Apr. 5	73.7	56.4
<i>April</i>		
6-12	60.6	44.7
13-19	50.2	46.5
20-26	42.8	82.0
27-May 3.	62.4	56.3
<i>May</i>		
4-10	37.6	43.5
11-17	68.1	32.3
18-24	59.2	41.9
25-31	52.7	43.1

Appendix Table 10. Weekly incidence of intestinal influenza or grippe in Pleasantville and Mt. Kisco. Three school years combined, September, 1946-May, 1949.

WEEKS	PLEASANTVILLE		MT. KISCO		PLEASANTVILLE		MT. KISCO	
	All Ages	5-18	All Ages	5-18	All Ages	5-18	All Ages	5-18
	Rate Per 1,000 Population				Number of Cases			
<i>September</i>								
1-7	0.7	0.0	1.4	1.9	4	0	9	5
8-14	0.5	0.4	0.9	1.9	3	1	6	5
15-21	0.3	0.4	1.9	3.4	2	1	13	9
22-28	1.0	2.1	0.7	1.1	6	5	5	8
29-Oct. 5	0.8	1.3	1.1	1.8	5	3	8	5
<i>October</i>								
6-12	1.1	1.7	1.7	1.4	7	4	12	4
13-19	1.9	1.7	1.4	1.4	12	4	10	4
20-26	1.7	2.1	0.7	1.1	11	5	5	3
27-Nov. 2	1.3	1.7	2.7	4.7	8	4	19	13
<i>November</i>								
3-9	3.4	5.4	1.1	1.8	22	13	8	5
10-16	3.3	2.5	5.2	6.9	21	6	37	19
17-23	3.4	6.2	4.6	5.4	22	15	33	15
24-30	3.3	3.7	5.2	5.8	21	9	37	16
<i>December</i>								
1-7	3.7	5.4	5.6	7.2	24	13	40	20
8-14	4.4	5.4	5.3	6.5	28	13	38	18
15-21	6.2	9.0	3.4	6.0	40	22	25	17
22-28	7.9	9.0	5.3	5.0	51	22	38	14
29-Jan. 4	7.6	10.2	6.6	5.7	49	25	48	16
<i>January</i>								
5-11	8.2	7.4	7.2	9.0	53	18	52	25
12-18	5.6	8.3	6.8	10.0	36	20	49	28
19-25	7.4	10.4	6.9	10.4	47	25	50	29
26-Feb. 1	8.6	9.6	5.0	6.8	55	23	36	19
<i>February</i>								
2-8	10.6	13.7	6.4	7.9	68	33	46	22
9-15	6.1	5.8	4.8	6.1	39	14	35	17
16-22	5.1	5.4	2.5	3.6	33	13	18	10
23-Mar. 1	5.7	7.0	5.4	9.0	37	17	39	25
<i>March</i>								
2-8	6.7	9.9	2.5	4.7	43	24	18	13
9-15	4.6	3.3	3.7	5.4	30	8	27	15
16-22	5.4	7.0	3.4	6.4	35	17	25	18
23-29	3.7	6.6	3.3	2.8	24	16	24	8
30-Apr. 5	4.8	10.7	2.6	1.8	31	26	19	5
<i>April</i>								
6-12	3.3	4.1	1.4	2.5	21	10	10	7
13-19	5.0	6.2	1.0	1.1	32	15	7	3
20-26	2.2	2.9	1.0	1.1	14	7	7	3
27-May 3	3.3	4.1	1.5	2.1	21	10	11	6
<i>May</i>								
4-10	1.6	1.7	2.5	2.5	10	4	18	7
11-17	2.8	4.1	1.4	1.8	18	10	10	3
18-24	0.9	1.2	1.0	0.7	6	3	7	2
25-31	1.9	3.2	1.3	2.3	11	7	9	6

SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY

XII. THE RELATIONSHIP OF GENERAL PLANNING TO FERTILITY PLANNING AND FERTILITY RATES¹

RONALD FREEDMAN AND P. K. WHELPTON

THIS paper is a report on an investigation of the following hypothesis: "The greater the tendency to plan in general, the higher the proportion of couples practicing contraception effectively and the smaller the planned families."

The hypothesis is based on the assumption that planning is a general rather than a specific trait, so that couples will tend to plan their family size if they plan their behavior in other areas of life. Since the data on "general planning" are mainly about economic behavior, it is more accurate to state the subject of investigation as the relationship between the planning of personal economic affairs on the one hand and the planning of fertility and size of planned family on the other hand.

The hypothesis is a restatement of the frequently made observation² that the increasing practice of family limitation and the decreasing size of family in modern times are part of an increasing tendency for individuals to weigh motives and actions rationally—that is, to plan behavior carefully.

The link between general planning and small family size is the less obvious part of the hypothesis. There are at least two alternative bases for expecting such a relationship. In the first place, the person who plans in general may be depicted as one whose rational calculations result in referring all questions to a narrow conception of self-interest. To such a person the traditional social norms reinforcing family life and the importance

¹ This is the twelfth of a series of reports on a study conducted by the Committee on Social and Psychological Factors Affecting Fertility, sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The committee consists of Lowell J. Reed, Chairman; Daniel Katz; E. Lowell Kelly; Clyde V. Kiser; Frank Lorimer; Frank W. Notestein; Frederick Osborn; S. A. Switzer; Warren S. Thompson; and P. K. Whelpton.

² *E.g.*, Myrdal, Alva: *NATION AND FAMILY*. New York, Harpers, 1942, p. 51.

of children have relatively little value. He is involved in what has been described as "social capillarity"—a situation in which the individual rather than the group is the more significant social unit.³

A second approach to the hypothesis is that those who plan belong to groups in which the small family is the accepted and sanctioned norm. The small family may result not from the failure to conform to social norms but rather from conformity to a specific social norm for the small family. However, from this point of view the planned family need not inevitably be the small family. Under certain conditions, a large family may be the group goal to which the individual member directs his planned action. On this view, the ends of fertility planning are not implicit in the fact of such planning, but may vary with the group membership of the person involved. The link between general planning and fertility planning appears to be more intrinsic than that between planning and the small family.⁴

It is also possible to reason that the more a person tends to plan the longer his list of things that parents need to do for children and the greater his estimate of the cost of doing these things; hence, the smaller the number of children he thinks he can afford to have. In this line of reasoning planning leads to a small family without the completely narrow conception of self interest.

General planning—especially economic planning—will be shown to be in part a function of socio-economic status. A

³ REPORT OF THE ROYAL COMMISSION ON POPULATION. London, His Majesty's Stationery Office, 1949, p. 39.

⁴ The two approaches to the relationship between planning and fertility developed in the preceding two paragraphs are stated more fully in Freedman, Ronald and Whelpton, P. K.: *Social and Psychological Factors Affecting Fertility*. X. Fertility Planning and Fertility Rates by Religious Interest and Denomination. The Milbank Memorial Fund *Quarterly*, July, 1950, pp. 294-300 (Reprint pp. 418-423).

In terms of these two theoretical approaches, the factors of religious interest and general planning may both be related, as indices, to the more general factor of rationality of behavior. Traditional attitudes, which are to be investigated in relation to family limitation in a later study can also be used as an index of rationality of behavior. Thus, all three of these studies can be conceived as investigating various aspects of the relationship of rationality of behavior to family limitation.

previous paper in this series has already demonstrated a close relationship between socio-economic status on the one hand and family planning and size of planned family on the other hand.⁵ Therefore, it will be of some importance to establish whether any relationship between general and fertility planning is more than a reflection of a joint relationship to socio-economic status. In a sense, this investigation, as well as others in the series, may be interpreted as an attempt to understand the nature of the relationship between socio-economic status and fertility patterns and to account for deviant cases not consistent with that relationship.

THE DATA

The methodology of the study and the nature of the data have been described in detail in previous reports of this series.⁶ The categories of fertility planning⁷ also have been described

⁵ Kiser, Clyde V. and Whelpton, P. K.: *Social and Psychological Factors Affecting Fertility*, ix. *Fertility Planning and Fertility Rates by Socio-Economic Status*. Milbank Memorial Fund *Quarterly*, April, 1949, xxvii, No. 2, pp. 188-244 (Reprint pp. 360-415).

⁶ *Ibid.*, p. 192 (Reprint p. 363).

⁷ In general, the detailed pregnancy and contraceptive histories, including data on outcome of pregnancies and attitudes toward each pregnancy, constitute the criteria for the classifications by planning status. The categories used, in descending degree of success in planning family size, are described below.

Number and Spacing of Pregnancies Planned. The 403 couples in this group exhibit the most complete planning of fertility in that they had no pregnancies that were not deliberately planned by stopping contraception in order to conceive. The group consists of two major subdivisions: (a) 121 couples practicing contraception regularly and continuously and having no pregnancy, and (b) 282 couples whose every pregnancy was deliberately planned by interrupting contraception in order to conceive.

Number Planned. This group of 205 couples consists mainly of those whose last pregnancy was deliberately planned by stopping contraception in order to conceive but who had one or more previous pregnancies under other circumstances. Because of this, the couples are regarded as having planned the number but not the spacing of their pregnancies.

For couples not classified as "number and spacing planned" or as "number planned" the previously mentioned criteria regarding attitudes of husband and wife to each pregnancy constituted the bases for classification.

Quasi-Planned. This group includes 454 couples who did not deliberately plan the last pregnancy in the manner described above but who either wanted the last pregnancy or wanted another pregnancy.

Excess Fertility. This group is composed of 382 couples classified as least successful in planning size of family because they neither wanted the last pregnancy nor another.

Ibid., pp. 210-211 (Reprint pp. 381-382).

previously. The present report deals with the "inflated" sample of 1,444 "relatively fecund" couples.⁸

Eleven questions⁹ were asked relating to general planning. They may be grouped as follows:

- a. Two questions involved separate ratings of the husband by the wife and *vice versa* on planning and "good management."
- b. Six questions called for self-reporting by husband and wife on specific behavior indicative of general planning—mainly in the economic sphere. Husbands and wives each made separate responses to four of these "behavior" questions. One question¹⁰ was answered only by the wife. One question¹¹ was answered only by husbands.
- c. The interviewer rated the husband and wife separately on a five-point planning-type scale.¹²

A check on the validity of the ratings may be made by comparing self-ratings and ratings by spouse on the same trait. For example, a wife's response to the question: "Do you plan things in advance or wait until the time comes?" may be compared with her husband's response to the question: "Does your wife plan things in advance or wait until the time comes?" Table 1 shows that while the relationship between these responses of wives and husbands is moderately close, it is obviously far from perfect. Other cross-tabulations of husband and wife ratings

⁸ In the application of chi-square tests of significance it does not appear to be appropriate to use the inflated sample without modification, since this would underestimate the sampling error. Therefore, the procedure followed has been to test each distribution on the assumption that the proportional entries in each cell are correct but that the *numbers* in each cell should be proportionately deflated to yield a total of 860 cases—the size of the sample actually interviewed. Since the inflation ratio was not the same for every part of the sample, but varied to yield a representative distribution by fertility, an argument may be made for deflating the sample to 635 cases to correspond with the highest inflation ratio. This would permit a more rigorous significance test than has been used in this study.

⁹ The questions are listed in the stubs of Tables 3, 4, 5, and in Appendix 1.

¹⁰ "Do you plan buying to take advantage of sales?"

¹¹ "What kinds of insurance do you carry?"

¹² Serious question must be raised about the independent validity of these ratings, because they were made by the interviewer after she had collected all the information for the study—including fertility data. It appears likely that her knowledge of the fertility, contraceptive history, and socio-economic status of the family may have influenced her ratings on general planning.

WIFE'S SELF-RATING	ALL COUPLES		HUSBAND'S RATING OF WIFE					
	Num- ber	Per Cent	Total	Almost Always Plan	Usu- ally Plan	Plan as Often as Wait	Usu- ally Wait	Almost Always Wait
ALL COUPLES*	1,444*	100.0	100	17.0	51.0	20.6	9.1	2.2
Almost Always Plan	211	14.6	100	30.3	49.8	13.7	5.2	0.9
Usually Plan	596	41.3	100	20.1	52.7	17.4	7.9	1.5
Plan as Often as Wait	413	28.6	100	10.9	52.8	24.0	10.9	1.4
Usually Wait	191	13.2	100	6.8	45.6	29.3	12.0	6.3
Almost Always Wait	33	2.3	100	9.1	36.4	30.3	15.2	9.1

* In this and succeeding tables the "total" row and column includes cases for which responses to general-planning questions are unknown.

Table 1. Percentage distribution by husband's rating of wife on planning, for couples with specified self-rating of wife on planning.

show similar results. The ratings must be considered to be rough indices.

Summary Indices of General Planning for the wife, the husband, and the couple were constructed by simply adding the code numbers for the responses to specific items.¹³ Nine items were added to obtain a General Planning Index for wife. Eight items were added to obtain a General Planning Index for the husband.¹⁴ The General Planning Indices for pairs of husbands and wives were added to obtain a General Planning Index for the couples. Since the individual item codes range in value from 1 to 9, the General Planning Indices range theoretically from 9 to 81 for wife, from 8 to 72 for husband, and 17 to 153 for the couple.¹⁵ The actual range of values was 9 to 69 for wives, 8 to 60 for husbands and 17 to 117 for couples. The indices are constructed so that low values indicate much general planning and high values indicate little general planning.

Table 2 shows the relationship between the General Plan-

¹³ The codes for the responses to individual questions were originally constructed to permit such addition.

¹⁴ The Interviewer's Rating of husband and wife on general planning was not used in constructing the indices, since its independent value is seriously in question.

¹⁵ The Indices for husband and wife are not equivalent, since the Index for the wife is based on nine items while the Index for the husband is based on eight items. The wife, but not the husband, was asked the question: "Do you plan your buying for family to take advantage of sale prices?"

GENERAL PLANNING INDEX FOR WIFE	ALL COUPLES		GENERAL PLANNING INDEX FOR HUSBAND			
	Number	Per Cent	Total	30	30-39	40 and Over
ALL COUPLES	1,444	100.0	100	28.5	44.1	27.4
Under 30	275	19.0	100	63.6	28.7	7.6
30-39	551	38.2	100	29.7	47.7	22.5
40-49	460	31.9	100	14.3	51.9	33.7
50 and Over	158	10.9	100	3.8	35.4	60.8

Table 2. Percentage distribution by general planning index for husband, for couples with specified planning index for wife.

ning Indices for wife and husband. While there is a close relationship between the two Indices, they are clearly not interchangeable. Therefore, general planning by husband and wife

Table 3. Percentage distribution, and births per 100 couples, by fertility-planning status, for couples with specified number of types of insurance carried.

NUMBER OF TYPES OF INSURANCE CARRIED	FERTILITY-PLANNING STATUS				
	Total	Number and Spacing Planned	Number Planned	Quasi- Planned	Excess Fertility
PERCENTAGE DISTRIBUTION					
ALL COUPLES*	100	27.9	14.2	31.4	26.5
Five or More Types	100	36.6	12.9	31.4	19.1
Two to Four Types	100	18.3	15.7	32.7	33.3
Life Insurance Only	100	15.3	14.0	32.0	38.7
BIRTHS PER 100 COUPLES					
ALL COUPLES*	203	106	228	199	296
Five or More Types	174	102	218	186	264
Two to Four Types	215	111	237	209	268
Life Insurance Only	293	126	243	225	433
NUMBER OF COUPLES					
ALL COUPLES*	1,444	403	205	454	382
Five or More Types	773	283	100	242	148
Two to Four Types	496	91	78	162	165
Life Insurance Only	150	23	21	48	58

* Includes 9 couples with 1 type of insurance but not life, and 16 couples with no insurance.

need not bear exactly the same relationship to the fertility variable.

Data on the insurance coverage of the family were collected as another indication of advance planning to meet future contingencies. Most of the families in the sample carried various kinds of insurance. Life insurance was the only kind carried to the exclusion of other types of insurance by any substantial number of families. All other kinds of insurance were carried in a large variety of combinations. As shown in Table 3, the classification of insurance coverage used in this study segregates those couples who carried life insurance only and classifies other couples by the number of kinds of insurance coverage.¹⁶

THE RELATIONSHIP BETWEEN GENERAL PLANNING AND FERTILITY PLANNING

There is a significant relationship between general planning and fertility planning, if the sample is considered as a whole. Tables 3-7 show that there is a positive relationship between most measures of general planning and the effectiveness of fertility planning.

For example, in response to the question: "Do you plan your buying to take advantage of sales?", one group of wives answered "Very often." Among these, 44.3 per cent were in the effective fertility-planning categories.¹⁷ Only 27.6 per cent of the wives answering "very seldom" to this question were in the effective fertility-planning group. Similar comparisons may be made for other individual items in Tables 4 and 5.

Table 6 shows the overall positive relationship between the three General Planning Indices and fertility planning. The contrast between extreme categories is very marked. For example, the percentage of effective fertility-planners is 89.6 among the couples classified as doing the most general planning

¹⁶ It was not possible to isolate each type of insurance coverage—other than life—with the size of the present sample. Life insurance was included in the coverage of couples who carried two or more kinds of insurance.

¹⁷ As in previous studies in this series, the two effective fertility planning categories are considered to be "number and spacing planned" and "number planned."

Table 4. Percentage distribution by fertility-planning status for couples with specified ratings on planning and good management.^a

RATINGS ^b	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	100	27.9	14.2	31.4	26.5	100	27.9	14.2	31.4	26.5
<i>Self-Rating on Planning</i>										
Almost Always Plan	100	30.3	22.3	24.2	23.2	100	38.4	11.4	27.8	22.4
Usually Plan	100	31.5	10.4	31.7	26.3	100	28.5	13.0	34.5	23.9
Plan as Often as Wait	100	23.7	14.8	35.6	25.9	100	22.5	16.6	29.3	31.7
Usually Wait	100	25.1	14.1	31.4	29.3	100	24.7	16.0	29.6	29.6
Almost Always Wait	100	15.2	24.2	21.2	39.4	100	17.0	21.3	27.7	34.0
<i>Rating by Spouse on Planning</i>										
Almost Always Plan	100	35.9	11.4	32.3	20.4	100	36.3	14.7	27.0	22.0
Usually Plan	100	28.7	15.6	31.0	24.7	100	25.9	14.9	35.0	24.2
Plan as Often as Wait	100	17.8	15.4	34.2	32.6	100	23.6	13.0	34.6	28.8
Usually Wait	100	30.5	9.9	31.3	28.3	100	29.5	12.2	29.9	28.4
Almost Always Wait	100	28.1	9.4	12.5	50.0	100	34.1	22.0	12.2	31.7
<i>Interviewer's Rating on Planning</i>										
Usually Farsighted	100	34.7	15.3	29.9	20.1	100	48.5	16.6	20.6	14.3
Thinks in Long-Time Terms	100	31.9	15.9	31.1	21.1	100	31.9	15.7	33.5	18.9
Average Forethought	100	25.2	13.7	34.7	26.4	100	21.6	13.4	37.1	27.9
Thinks in Day-to-Day Terms	100	14.6	9.5	24.1	51.8	100	15.9	10.9	23.5	49.7
No Concern for Future	*	—	—	—	—	100	14.3	0.0	14.3	71.4
<i>Self-Rating on Good Management</i>										
Excellent	100	47.5	32.5	15.0	5.0	100	34.5	6.9	24.1	34.5
Very Good	100	38.0	15.7	27.3	19.0	100	29.3	15.2	27.3	28.3
Good	100	28.5	12.8	29.5	29.2	100	39.0	14.6	27.4	19.0
About Average	100	23.9	13.9	34.4	27.7	100	24.2	14.1	33.5	28.1
Somewhat Poorer Than Average	100	50.0	5.9	26.5	17.6	100	18.6	15.3	37.3	28.8
Poor or Very Poor	*	—	—	—	—	100	18.7	14.6	29.2	37.5
<i>Rating by Spouse on Good Management</i>										
Excellent	100	41.5	12.3	28.1	18.1	100	35.0	22.0	27.0	16.0
Very Good	100	27.7	14.5	32.8	23.0	100	38.8	16.8	27.2	17.2
Good	100	28.4	13.5	28.9	29.1	100	26.1	13.6	33.5	26.7
About Average	100	21.1	15.9	33.8	29.1	100	24.5	11.5	33.4	30.6
Somewhat Poorer Than Average	100	37.0	13.0	41.3	8.7	100	20.3	15.3	33.8	30.5
Poor or Very Poor	100	12.5	4.2	20.8	62.5	100	29.2	25.0	16.7	29.2

^a See Appendix 2, Table 13 for numerical distributions.

^b See Appendix 1, for exact questions to which ratings were responses.

* Percentages not computed for total less than 20.

Table 5. Percentage distribution by fertility-planning status of couples with rating on specified planning of other types.^a

EXTENT OF OTHER PLANNING ^b	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	100	27.9	14.2	31.4	26.5	100	27.9	14.2	31.4	26.5
<i>Frequency Run Out of Money Between Pay Checks</i>										
Very Seldom	100	37.1	12.4	26.0	24.5	100	39.1	12.7	26.1	22.1
Seldom	100	29.2	13.1	36.5	21.3	100	31.7	13.0	27.9	27.5
Sometimes	100	23.2	16.0	33.6	27.2	100	22.1	16.3	40.0	21.6
Often	100	21.7	14.5	29.5	34.3	100	17.0	12.7	35.8	34.5
Very Often	100	17.6	16.7	30.4	35.3	100	21.4	17.9	17.9	42.9
<i>Keep Extras on Hand for Emergencies</i>										
Definitely Yes	100	31.3	15.8	29.4	23.5	100	30.2	14.6	30.6	24.6
Probably Yes	100	24.2	12.5	35.3	28.0	100	27.8	13.6	30.3	28.3
Doubtful	100	14.9	4.3	23.4	57.4	100	11.4	10.0	50.0	28.6
Probably No or Definitely No	100	15.8	13.2	36.8	34.2	100	6.7	23.3	30.0	40.0
<i>Is Installment Buying Good Management</i>										
Definitely No	100	40.7	15.6	22.2	21.6	100	31.6	15.6	20.3	32.5
Probably No	100	29.8	11.9	27.7	30.6	100	28.2	10.3	28.6	32.9
Doubtful	100	24.8	13.3	33.8	28.1	100	25.3	16.1	35.2	23.4
Probably Yes	100	27.9	14.2	33.6	24.4	100	27.3	15.2	34.7	22.8
Definitely Yes	100	17.6	17.6	34.5	30.3	100	28.4	11.3	33.5	26.8
<i>Household Purchases on Installment Plan</i>										
None	100	49.6	15.0	17.7	17.7	100	46.8	13.9	17.0	22.3
Few	100	35.2	8.3	33.1	23.4	100	36.2	12.3	28.8	22.6
Some	100	26.8	15.7	28.5	29.0	100	20.1	16.4	26.8	27.7
Most of Them	100	22.4	14.3	37.1	26.3	100	22.2	13.1	38.4	26.3
All of Them	100	18.5	21.5	26.7	33.3	100	23.1	17.4	24.8	34.7
<i>Plan to Buy at Sales^c</i>										
Very Often	100	30.9	13.4	31.3	24.4					
Often	100	25.1	16.8	30.0	28.1					
Sometimes	100	27.9	12.9	35.1	24.1					
Seldom	100	30.6	11.1	19.4	38.9					
Very Seldom	100	20.7	6.9	20.7	51.7					

^a See Appendix, 2, Table 14 for numerical distributions.

^b See Appendix 1 for exact questions asked.

^c Question asked only of wives.

(under 40) and 36.8 among the couples classified as doing the least general planning (100 and over).

In Table 7 the General Planning Indices for husband and wife are cross-classified to show how various configurations of the two Indices are related to fertility planning. The data indicate that the General Planning for one member of the couple tends to be positively related to fertility planning even after the General Planning Index for the other member of the couple has been taken into account. As might be expected, the highest proportion of effective fertility-planners—66.2 per cent—is

Table 6. Percentage distribution, and births per 100 couples by fertility-planning status, for couples with specified indices of general planning.

GENERAL PLANNING INDICES	PER CENT DISTRIBUTION BY FERTILITY-PLANNING STATUS ^a					BIRTHS PER 100 COUPLES BY FERTILITY-PLANNING STATUS ^a				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	100	27.9	14.2	31.4	26.4	203	106	228	199	296
General Planning Index of Wife:										
Under 20 (High)	100	62.5	17.5	7.5	12.5	138	108	*	*	*
20-29	100	39.1	15.7	25.5	19.6	180	104	254	192	254
30-39	100	29.6	13.1	32.3	25.0	193	107	221	194	278
40-49	100	18.5	13.7	37.2	30.6	231	108	224	209	334
50 and Over (Low)	100	24.0	16.4	26.6	32.9	209	103	223	195	292
General Planning Index of Husband:										
Under 20 (High)	100	52.1	11.3	15.5	21.1	175	111	*	*	*
20-29	100	38.8	13.5	27.6	20.0	171	96	228	171	279
30-39	100	25.3	14.0	32.2	28.6	206	109	217	203	292
40-49	100	19.6	14.8	37.8	27.8	227	125	252	212	305
50 and Over (Low)	100	9.1	22.7	25.0	43.2	252	*	*	*	*
General Planning Index of Couple:										
Under 40 (High)	100	65.5	24.1	10.3	0.0	159	*	*	*	*
40-59	100	43.9	13.0	23.0	20.1	166	102	231	169	261
60-79	100	26.1	13.1	35.5	25.3	202	108	231	196	290
80-99	100	19.1	15.6	32.1	33.2	232	111	231	222	312
100 and Over (Low)	100	19.3	17.5	29.8	33.3	193	*	*	*	*

^a See Appendix 2, Table 15 for numerical distributions and bases for rates.

* Rates not computed for base less than 20.

Table 7. Percentage distribution by fertility-planning status of couples with specified general planning index for husband and wife.

GENERAL PLANNING INDEX OF HUSBAND BY GENERAL PLANNING INDEX OF WIFE	FERTILITY-PLANNING STATUS				
	Total	No. and Spacing Planned	Number Planned	Quasi- Planned	Excess Fer- tility
PER CENT DISTRIBUTION					
ALL COUPLES	100	27.9	14.2	31.4	26.5
Husband's General Planning Index: Under 30					
Wife's General Planning Index:					
Under 30	100	49.1	17.1	17.1	16.6
30-39	100	43.3	7.9	27.4	21.3
40-49	100	18.1	10.6	42.5	28.7
50 and Over	*	—	—	—	—
Husband's General Planning Index: 30-39					
Wife's General Planning Index:					
Under 30	100	27.8	12.6	31.6	27.8
30-39	100	25.5	16.3	32.3	25.9
40-49	100	23.0	12.1	36.0	28.9
50 and Over	100	30.3	12.5	16.1	41.0
Husband's General Planning Index: 40 and Over					
Wife's General Planning Index:					
Under 30	100	42.8	19.0	38.1	—
30-39	100	20.2	12.9	38.7	28.2
40-49	100	11.6	17.4	36.8	34.2
50 and Over	100	21.8	15.6	32.3	30.2
NUMBER					
ALL COUPLES	1,444	403	205	454	382
Husband's General Planning Index: Under 30					
Wife's General Planning Index:					
Under 30	175	86	30	30	29
30-39	164	71	13	45	35
40-49	66	12	7	28	19
50 and Over	6	—	4	2	—
Husband's General Planning Index: 30-39					
Wife's General Planning Index:					
Under 30	79	22	10	25	22
30-39	263	67	43	85	68
40-49	239	55	29	86	69
50 and Over	56	17	7	9	23
Husband's General Planning Index: 40 and Over					
Wife's General Planning Index:					
Under 30	21	9	4	8	—
30-39	124	25	16	48	35
40-49	155	18	27	57	53
50 and Over	96	21	15	31	29

* Percentages not computed for total less than 20.

found among those cases in which both husband and wife are in the category reflecting the most general planning. Among the cases in which both husband and wife indicate the least general planning, the proportion of effective fertility-planners is low—37.4 per cent—although not the lowest of all the groupings in Table 7.

A minimum test of the hypothesis for any particular general planning item is that the extreme category indicating the most general planning should have a higher percentage of effective fertility-planners and a lower percentage of "excess fertility" couples than the extreme category indicating the least general planning. The data in Tables 4 and 5 indicate that all of the ten specific items for wife and seven of nine specific items for husbands meet this minimum test. In addition to three General Planning Indices, the cross-classification of the husband and wife General Planning Indices, and the classification by types of insurance all meet this test.

Chi-square was computed as an overall test of the significance of the relationships between each general planning item and fertility planning.¹⁸ The relationship is highly significant for each of the three General Planning Indices and for the types of insurance carried. For the specific items listed in Tables 3 and 4, the chi-square tests show statistically significant relationships at the .05 level for 7 of 10 items for wives, and 7 of 9 items for husbands.

The foregoing evidence has indicated that a significant relationship does exist in the sample as a whole between fertility planning and the measures of general planning under consideration. A previous analysis has indicated a much closer relationship between fertility planning and socio-economic status. As pointed out earlier, most of the measures of general planning used in this study relate to personal economic matters, which may bear a close relationship to socio-economic status. It is

¹⁸ Appendix 3, Table 16, shows the levels at which chi-square is significant for the various relationships in Tables 3-7. The chi-square values for the relationships involving the General Planning Index for the couple and the cross-classification of General Planning Index for husband and wife are all significant at the .001 level.

INDEX OF SOCIO-ECONOMIC STATUS	NUMBER OF COUPLES	GENERAL PLANNING INDEX OF COUPLES				
		Total	Under 60	60-79	80-89	100 and Over
ALL COUPLES	1,444	100	20.6	46.5	28.9	3.9
0-19 (High)	224	100	48.6	41.5	9.8	0.0
20-29	243	100	35.0	46.1	13.6	5.3
30-39	323	100	15.5	59.1	22.6	2.8
40-49	403	100	8.7	47.4	38.2	5.7
50 and Over (Low)	251	100	7.6	33.5	54.2	4.8

Table 8. Percentage distribution by general planning index for couples with specified index of socio-economic status.

very important, therefore, to inquire whether the relationship between general planning and fertility planning may not be a product of the joint relation between the two types of planning and socio-economic status.

There is a strong association between the various indices of general planning and socio-economic status, but it is not so high as to preclude an independent relationship between general and fertility planning within socio-economic status subgroups. This is illustrated in Table 8 which shows the association between an Index of Socio-Economic Status¹⁹ and the General Planning Index for couples. In general, the various measures of general planning are more closely related to socio-economic status than to fertility planning.²⁰

¹⁹ This Index was developed by Kiser and Whelpton, *op. cit.*, pp. 214, 216 (Reprint pp. 385, 387). It is a simple summation of the ratings of each couple on a 8, 9, or 10 point code for each of the following eight items: husband's average annual earnings since marriage, net worth, shelter rent at interview, husband's longest occupational class since marriage, purchase price of car, education of wife, education of husband, and rating of the household on Chapin's Social Status Scale. A low score on the Index indicates a high socio-economic status and *vice versa*. With the code numbers used a couple could receive any score from 1 to 72. The actual range of variation extended from 1 to 69. Kiser and Whelpton found that five groupings of the sample based on this Index serve to differentiate the couples with respect to planning status and fertility very well as compared with any of the conventional individual items.

²⁰ Each of the planning items was correlated separately with fertility planning status and socio-economic status. The computations for each of these pairs of contingency coefficients were based on classifications of the data into comparable table forms. The correlations involving socio-economic status were higher than those involving fertility-planning status for the three General Planning Indices for types of insurance held, and for 8 of 10 individual items for wife and 6 of 9 individual items for husband.

The relationship between various indices of general planning and fertility planning was investigated within each of the five socio-economic status categories to determine whether the relationship is independent of socio-economic status. As a minimum test of the hypotheses, extreme categories on each general planning item were compared within each socio-economic subgroup as to percentage of effective fertility-planners. To support the hypothesis any particular comparison should show the highest percentage of effective fertility-planners in the category indicating the greatest amount of general planning.

Table 9 illustrates this analysis for the General Planning In-

Table 9. Percentage distribution by fertility-planning status for couples with specified index of socio-economic status and general planning index.

INDEX OF SOCIO-ECONOMIC STATUS BY GENERAL PLANNING INDEX FOR COUPLES	NUMBER OF COUPLES	FERTILITY-PLANNING STATUS				
		Total	No. and Spacing Planned	Num- ber Planned	Quasi- Planned	Excess Fer- tility
ALL COUPLES	1,444	100	27.9	14.2	31.4	26.5
<i>Socio-Economic Status: 0-19</i>						
<i>General Planning Index:</i>						
Under 60	109	100	62.4	9.2	12.8	15.6
60-79	93	100	35.5	19.4	36.6	8.6
80 and Over	22	100	36.4	22.7	31.8	9.1
<i>Socio-Economic Status: 20-29</i>						
<i>General Planning Index:</i>						
Under 60	85	100	34.1	23.5	28.2	14.1
60-79	112	100	44.6	10.7	33.0	11.6
80 and Over	46	100	34.8	28.3	30.4	6.5
<i>Socio-Economic Status: 30-39</i>						
<i>General Planning Index:</i>						
Under 60	50	100	48.0	14.0	22.0	16.0
60-79	191	100	28.0	12.6	41.9	22.5
80 and Over	82	100	17.1	13.4	39.0	30.5
<i>Socio-Economic Status: 40-49</i>						
<i>General Planning Index:</i>						
Under 60	35	100	28.6	14.3	22.8	34.3
60-79	191	100	22.0	10.5	34.6	33.0
80 and Over	177	100	20.3	11.3	32.2	36.2
<i>Socio-Economic Status: 50 and Over</i>						
<i>General Planning Index:</i>						
Under 60	33	100	18.2	42.4	24.2	15.2
60-79	94	100	6.4	25.5	22.3	45.7
80 and Over	124	100	13.7	1.6	33.1	51.6

dex for couples. For this Index and for the other two General Planning Indices, the category reflecting most general planning has a higher proportion of effective fertility-planners than the category reflecting least general planning in four of the five socio-economic status groups. In each case the comparisons are inconsistent with the hypothesis only in the 20-29 socio-economic status group. Apart from this group, the relationship between general planning and fertility planning is apparently not entirely a function of socio-economic status.

Comparisons were also made within socio-economic categories between couples holding two to four kinds of insurance and those holding five or more kinds. In each socio-economic status group the latter have the highest percentage of effective fertility-planners.

Similar comparisons were made for each of the individual general planning items listed in Tables 4 and 5. The number of comparisons consistent with the hypothesis in each socio-economic status group is tabulated below:

<i>Socio-Economic Status</i>	<i>Number of Items Consistent with Hypothesis in Comparisons Based on Responses of</i>	
	<i>Wives</i>	<i>Husbands</i>
0-19	8 of 10	8 of 9
20-29	4 of 10	1 of 9
30-39	7 of 10	8 of 9
40-49	6 of 10	6 of 9
50 and Over	5 of 10	8 of 9

A number of conclusions may be drawn from these comparisons. First, overall for husbands and wives, the comparisons are most consistent with the hypothesis for the highest socio-economic status category. Secondly, except for the 20-29 socio-economic status category, the relationship between general planning and fertility planning is more consistent for the general planning responses of husbands than of wives. The comparisons based on the individual items do not lend much

support to the hypothesis except for those based on the husband's responses. However, as we have already seen, when the effects of the individual items for each person are combined in the General Planning Indices, the results are more consistent with the hypothesis.

While the evidence is far from conclusive, there is a tendency for the relationship between general planning and fertility planning to be maintained to some degree within specific socio-economic status groups—except for the 20-29 group. This is particularly true for the general planning characteristics of the husband. However, a considerable part, but not all, of the relationship between general planning and fertility planning, results from their joint connection to socio-economic status.

THE RELATIONSHIP BETWEEN GENERAL PLANNING AND FERTILITY

The second part of the hypothesis is "the greater the tendency to plan in general . . . the smaller the planned families." While the hypothesis refers only to "planned" families, other families are considered in the analysis for purposes of contrast. Fertility is measured by number of live births per hundred couples.

For the sample as a whole there is clearly an inverse relationship between general planning and fertility. This may be seen by inspection of the total columns in Tables 3, 6, and 10 to 12. In the case of the three Indices of General Planning (Table 6), the high index categories (indicating little general planning) have relatively high fertility rates. Similarly, for the items in Tables 10 and 11, the pattern of fertility rates tends to be consistent with the hypothesis if the extreme general planning categories are used for comparison in each case. Thus, in Tables 10 and 11, for the responses of wives, the category indicating most general planning has a lower fertility rate than the category indicating least general planning in 8 of 10 cases. For responses of husbands, this is true for every item—9 out of 9 cases. There is similar evidence in the data on types of insur-

ance coverage. As Table 3 indicates, the lowest fertility rates are for persons carrying five or more types of insurance, and the highest rates are for persons carrying life insurance only. For most items the data are consistent with the hypothesis even when intermediate categories of general planning are con-

Table 10. Births per 100 couples by fertility-planning status by ratings of husbands and wives on planning and good management.*

RATINGS ^b	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	203	106	228	199	296	203	106	228	199	296
<i>Self-Rating on Planning</i>										
Almost Always Plan	192	117	221	198	253	185	113	237	180	287
Usually Plan	202	105	244	203	302	201	100	222	207	300
Plan as Often as Wait	206	110	226	200	289	212	113	221	196	294
Usually Wait	206	88	200	188	330	214	95	242	198	315
Almost Always Wait	236	*	*	*	*	223	*	*	*	*
<i>Rating By Spouse on Planning</i>										
Almost Always or Usually Plan	199	106	221	200	303	195	102	239	198	280
Plan as Often as Wait	211	111	217	201	274	210	110	219	202	298
Usually Wait	208	115	*	176	305	207	112	203	191	323
Almost Always Wait	244	*	*	*	*	220	114	*	*	296
<i>Interviewer's Rating on Planning</i>										
Unusually Farsighted	185	136	250	177	234	169	124	224	192	224
Thinks in Long-Time Terms	173	92	212	182	252	181	99	219	193	268
Average Forethought	214	114	229	207	310	204	102	240	191	283
Less Than Average Forethought	302	110	*	277	361	286	109	250	264	354
<i>Self-Rating on Good Management</i>										
Excellent or Very Good	191	97	228	228	332	209	113	*	185	321
Good	197	101	213	204	277	190	119	241	206	275
About Average	210	113	233	193	304	203	98	223	197	292
Below Average	176	108	*	*	*	238	115	*	217	334
<i>Rating By Spouse on Good Management</i>										
Excellent or Very Good	191	104	234	191	304	189	103	249	209	280
Good	200	101	228	199	284	195	111	206	184	284
About Average	218	120	218	206	303	215	111	231	203	307
Below Average	202	95	*	204	*	202	81	210	207	291

* See Appendix, 2, Table 13 for numerical bases for rates.

* See Appendix 1 for exact questions to which ratings were responses.

* Rates not computed for base less than 20.

Table 11. Births per 100 couples by fertility-planning status by rating on specified planning of "other types."^a

EXTENT OF OTHER PLANNING ^b	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	203	106	228	199	296	203	106	228	199	296
<i>Frequency Run Out of Money between Pay Checks</i>										
Very Seldom	171	102	226	190	226	163	100	222	161	242
Seldom	191	95	226	193	297	197	99	232	207	288
Sometimes	217	122	224	203	312	214	121	224	210	310
Often	231	92	246	206	333	236	128	238	217	309
Very Often	264	*	*	223	367	255	83	240	210	367
<i>Keeps Extras on Hand for Emergencies</i>										
Definitely Yes	188	102	221	197	270	195	103	238	189	289
Probably Yes	222	121	247	198	330	207	113	211	212	294
Doubtful	226	*	*	*	259	243	*	*	186	365
Probably No or Definitely No	260	*	*	*	*	270	*	*	*	*
<i>Is Installment Buying Good Management</i>										
Definitely No	184	98	273	214	250	197	92	242	179	289
Probably No	202	114	236	188	288	215	112	268	198	301
Doubtful	220	139	230	205	304	207	115	221	214	285
Probably Yes	206	101	221	198	327	197	113	228	190	288
Definitely Yes	186	59	200	200	236	209	93	182	220	329
<i>Household Purchases on Installment Plan</i>										
None	184	114	*	220	300	179	111	*	*	267
Few	192	120	242	182	299	190	100	253	170	324
Some	202	100	231	187	294	197	110	228	200	267
Most of Them	213	100	227	213	301	212	107	224	205	304
All of Them	209	92	210	200	280	220	104	210	213	307
<i>Plan to Buy at Sales^c</i>										
Very Often or Often	206	113	228	204	296					
Sometimes	200	103	224	194	309					
Seldom	186	*	*	*	*					
Very Seldom	172	*	*	*	*					

^a See Appendix 2, Table 14 for numerical bases for rates.

^b See Appendix 1 for exact questions asked.

^c Question asked only of wives.

* Rates not computed for base less than 20.

sidered. With a few exceptions, a decrease in fertility rates accompanies each increase in general planning.

The association between general planning and fertility within each of the four fertility-planning status groups is shown in Tables 10 and 11 for specific general planning items. The minimum test of the hypothesis considered is that for each item the category indicating least general planning should have a higher fertility rate than the category indicating the most general planning. The data for wives do not meet this test very well. For the items of Tables 10 and 11, ten comparisons for

Table 12. Births per 100 couples by fertility-planning status, for couples with specified general planning index for wife and husband.

GENERAL PLANNING INDEX FOR WIFE BY THAT FOR HUSBAND	FERTILITY-PLANNING STATUS				
	Total	No. and Spacing Planned	Number Planned	Quasi- Planned	Excess Fer- tility
ALL COUPLES	203	106	228	199	296
<i>Wife's General Planning Index: Total</i>					
<i>Husband's General Planning Index:</i>					
Under 30	172	99	231	171	282
30-39	206	109	217	203	292
40 and Over	230	118	242	215	311
<i>Wife's General Planning Index: Under 30</i>					
<i>Husband's General Planning Index:</i>					
Under 30	158	102	237	173	224
30-39	168	114	•	216	268
40 and Over	215	•	•	•	•
<i>Wife's General Planning Index: 30-39</i>					
<i>Husband's General Planning Index:</i>					
Under 30	168	99	•	164	294
30-39	199	115	216	199	272
40 and Over	213	112	•	212	271
<i>Wife's General Planning Index: 40 and Over</i>					
<i>Husband's General Planning Index:</i>					
Under 30	215	•	•	180	•
30-39	211	101	203	203	313
40 and Over	243	123	264	219	328
<i>Husband's General Planning Index: Total</i>					
<i>Wife's General Planning Index:</i>					
Under 30	173	105	250	228	243
30-39	193	74	221	194	278
40 and Over	225	107	213	207	323

• Rates not computed for base less than 20.

wives are possible within each of the four fertility-planning status categories—forty comparisons in all. Only fifteen of these forty comparisons are consistent with the hypothesis. In the two effective fertility-planning categories, only six of the twenty comparisons are consistent with the hypothesis.

For the general planning responses of husbands shown in Tables 10 and 11, thirty-six such comparisons are possible. Twenty-two of the thirty-six comparisons are consistent with the hypothesis—with seven of eighteen comparisons consistent in the two general planning categories.

Clearly, the analysis within fertility-planning status categories based on individual general planning items gives little support to the hypothesis, although husbands' responses are more consistent than those of wives. However, in the summation of individual items in the General Planning Index for husbands, there is evidence of the inverse relationship of general planning and fertility.

Table 12 contains the fertility rates for each of the four fertility planning groups classified by the General Planning Index for husbands and wives. In the two effective fertility-planning categories, the fertility rates are negatively related to the General Planning Index for husbands, but not to the Index for wives.²¹ Further, this relationship for husbands remains, even when the General Planning Index for the wife is taken into account by cross-classification.

Table 6 shows the fertility rates by the General Planning Indices for husband and wife in somewhat greater detail. In the "number and spacing planned" category the fertility rates vary little with the General Planning Index for wife. In the "number planned" category the relationship appears to be positive rather than negative. In fact, only in the "excess fertility" category is there clearly a negative relationship between the General Planning Index for the wife and fertility rates of the couple.²²

²¹ The direction of the relationships described in this and the next paragraph refers in all cases to the meaning of the Index, not to the actual magnitude of the Index itself. A high Index means little general planning and *vice versa*.

²² An anomaly appears if the relationship between fertility rate and the Gen-

On the other hand for each of the four fertility planning status groups, there is clearly a negative relationship between extent of husband's General Planning as measured by the Index and the fertility of the couple.

One interpretation of these data taken in connection with the findings of the previous section is as follows:

The general planning characteristics of both husband and wife are relevant to their fertility planning status, but among those couples that do plan, only the general planning characteristics of the husband are related to the size of planned family. The general planning characteristics of the wife may help to determine whether the family will be planned, but they are not independent determinants of the size of planned family.

SUMMARY

For the sample as a whole, various measures of general planning are directly related to the planning of fertility and inversely related to fertility. This is true whether the measure of

eral Planning Indices is examined. This involves combining the "number and spacing planned" and the "number planned" categories from Table 6 into a single group. The resulting rates are shown below:

<i>General Planning Index^a</i>	<i>Births per 100 Couples</i>		
	<i>By Index for Wife</i>	<i>By Index for Husband</i>	<i>By Index for Couple</i>
TOTAL	148	148	148
Under 20	134	136	158
20-29	147	130	137
30-39	142	147	149
40-49	157	179	165
50 and Over	152	•	110

^a The coded values for index of the couple are twice as large as those shown.

See Appendix, Table 15.

• Rate not computed for base less than 20.

The anomaly is that for effective planners a negative relationship appears between the general planning of the wife and fertility while neither of the constituent planning groups shows such a relationship in Table 6. The negative relationship for the combined "effective fertility-planners" appears to be an artifact resulting from the pronounced differences between the two fertility planning groups in their distribution by the General Planning Index for wives. This in turn weights the differences in fertility rates of the two groups in such a way as to produce a "spurious" negative relationship when the two fertility-planning status groups are combined. The relationships shown in Table 6 with the more complete control of fertility planning seem to be the more valid.

general planning is based on the behavior of the wife, of the husband, or of the couple.

To a large extent—but not entirely—the relationship between general planning and fertility planning is a function of the socio-economic status of the couple. Within specific socio-economic status groups, the relationship is maintained most consistently for the general planning characteristics of the husband.

When the four fertility planning groups are considered separately important exceptions are found to the inverse relation between general planning and size of family. In the "number and spacing planned" and "number planned" groups only the General Planning Index of the husband is inversely related to fertility rates. The inverse relationship for wives is found only in the "excess fertility" group. Even for husbands the inverse relationship does not appear consistently for individual items but only in their summary in the General Planning Index.

The influence of general planning on size of family is mainly through its influence on fertility-planning status. What remains when socio-economic status and fertility planning status are held constant is mainly a function of the husband's general planning characteristics.

Thus, the initial promising relationship between general planning and fertility patterns is not strongly maintained when the data are analyzed with the use of significant controls in an attempt to get at more basic relationships. Although general planning may be an important constituent element of socio-economic status, its independent predictive power in this kind of fertility study is not great. A more persistent relationship might have been found if additional questions had been asked regarding planning in other fields than personal economic affairs.

APPENDIX I

The Questions on General Planning

The exact questions asked in the study relevant to general planning are listed below. They are listed by order under the number of the table in which they are first related to fertility planning status:

Table 3:

- Do you plan things in advance or wait until the time comes?
- Does your wife (husband) plan things in advance or wait until the time comes?
- Are you a good manager?
- Is your wife (husband) a good manager?

Table 4:

- When you (your husband) have worked steadily, how often have you run out of money between pay checks?
- Do you try to keep extra things on hand for emergencies, like a little cash, razor blades, shoe laces, (canned goods), first aid supplies, etc.?
- Is it good management to use the installment plan when buying household goods?
- Many Americans buy household goods on the monthly (or weekly) payment plan. What part of yours have you bought that way?
- Do you plan your buying for the family to take advantage of sale prices?

Table 7:

- What kinds of insurance do you carry?

APPENDIX 2

Table 13. Number of couples, by fertility-planning status, by ratings of husband and wife on planning and good management.

RATINGS	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	1,444	403	205	454	382	1,444	403	205	454	382
<i>Self-Rating on Planning</i>										
Almost Always Plan	211	64	47	51	49	237	91	27	66	53
Usually Plan	596	188	62	189	157	660	188	86	228	158
Plan as Often as Wait	413	98	61	147	107	338	76	56	99	107
Usually Wait	191	48	27	60	56	162	40	26	48	48
Almost Always Wait	33	5	8	7	13	47	8	10	13	16
<i>Rating by Spouse on Planning</i>										
Almost Always Plan	245	88	28	79	50	204	74	30	55	45
Usually Plan	736	211	115	228	182	471	122	70	165	114
Plan as Often as Wait	298	53	46	102	97	399	94	52	138	115
Usually Wait	131	40	13	41	37	288	85	35	86	82
Almost Always Wait	32	9	3	4	16	82	28	18	10	26
<i>Interviewer's Rating on Planning</i>										
Unusually Farsighted	144	50	22	43	29	175	85	29	36	25
Thinks in Long-Time Terms	598	191	95	186	126	529	169	83	177	100
Average Forethought	548	138	75	190	145	523	113	70	194	46
Thinks in Day-to-Day Terms	137	20	13	33	71	183	29	20	43	91
No Concern for Future	14	1	—	2	11	28	4	—	4	20
<i>Self-Rating on Good Management</i>										
Excellent	40	19	13	6	2	29	10	2	7	10
Very Good	121	46	19	33	23	99	29	15	27	28
Good	414	118	53	122	121	336	131	49	92	64
About Average	819	196	114	282	227	871	211	123	292	245
Somewhat Poorer Than Average	34	17	2	9	6	59	11	9	22	17
Poor or Very Poor	16	7	4	2	3	48	9	7	14	18
<i>Rating by Spouse on Good Management</i>										
Excellent	171	71	21	48	31	100	35	22	27	16
Very Good	296	88	43	97	68	232	90	39	63	40
Good	443	126	60	128	129	352	92	48	118	94
About Average	464	98	74	157	135	653	160	75	218	200
Somewhat Poorer Than Average	46	17	6	19	4	59	12	9	20	18
Poor or Very Poor	24	3	1	5	15	48	14	12	8	14

Table 14. Number of couples, by fertility-planning status, by rating on planning of other types.

EXTENT OF OTHER PLANNING ^a	RATING OF WIFE					RATING OF HUSBAND				
	Fertility-Planning Status					Fertility-Planning Status				
	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	1,444	403	205	454	382	1,444	403	205	454	382
<i>Frequency Run Out of Money Between Pay Checks</i>										
Very Seldom	396	147	49	103	97	402	157	51	105	89
Seldom	329	96	43	120	70	262	83	34	73	72
Sometimes	449	104	72	151	122	435	96	71	174	94
Often	166	36	24	49	57	229	39	29	82	79
Very Often	102	18	17	31	36	112	24	20	20	48
<i>Keep Extras on Hand for Emergencies</i>										
Definitely Yes	863	270	136	254	203	829	250	121	254	204
Probably Yes	496	120	62	175	139	515	143	70	156	146
Doubtful	47	7	2	11	27	70	8	7	35	20
Probably No or Definitely No	38	6	5	14	13	30	2	7	9	12
<i>Is Installment Buying Good Management</i>										
Definitely No	167	68	26	37	36	231	73	36	47	75
Probably No	235	70	28	65	72	213	60	22	61	70
Doubtful	278	69	37	94	78	261	66	42	92	61
Probably Yes	599	167	85	201	146	545	149	83	189	124
Definitely Yes	165	29	29	57	50	194	55	22	65	52
<i>Household Purchases on Installment Plan</i>										
None	113	56	17	20	20	94	44	13	16	21
Few	290	102	24	96	68	243	88	30	70	55
Some	396	106	62	113	115	354	103	58	95	98
Most of Them	510	114	73	189	134	632	140	83	243	166
All of Them	135	25	29	36	45	121	28	21	30	42
<i>Plan to Buy at Sales^b</i>										
Very Often	479	148	64	150	117					
Often	481	121	81	144	135					
Sometimes	419	117	54	147	101					
Seldom	86	11	4	7	14					
Very Seldom	29	6	2	6	15					

^a See Appendix 1 for exact questions asked.

^b Question asked only of wives.

Table 15. Number of couples by fertility-planning status, by general planning indices.

GENERAL PLANNING INDICES	FERTILITY-PLANNING STATUS				
	Total	No. and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
ALL COUPLES	1,444	403	205	454	382
<i>General Planning Index of Wife:</i>					
Under 20	40	25	7	3	5
20-29	235	92	37	60	46
30-39	551	163	72	178	138
40-49	460	85	63	171	141
50 and Over	158	38	26	42	52
<i>General Planning Index of Husband:</i>					
Under 20	71	37	8	11	15
20-29	340	132	46	94	68
30-39	637	161	89	205	182
40-49	352	69	52	133	98
50 and Over	44	4	10	11	19
<i>General Planning Index of Couple:</i>					
Under 40	29	19	7	3	-
40-59	269	118	35	62	54
60-79	671	175	88	238	170
80-99	418	80	65	134	139
100 and Over	57	11	10	17	19

APPENDIX 3

Table 16. Level of significance of chi-square values for relationship of questions on general planning to the index of socio-economic status and to fertility-planning status.

QUESTIONS AND ITEMS ON GENERAL PLANNING	INDEX OF SOCIO-ECONOMIC STATUS		FERTILITY-PLANNING STATUS	
	Wives	Husbands	Wives	Husbands
Self-Rating on Planning	a	b	b	b
Rating by Spouse on Planning	c	a	b	c
Interviewer's Rating on Planning	a	a	a	a
Self-Rating on Good Management	c	a	a	b
Rating by Spouse on Good Management	c	a	c	a
Frequency Run Out of Money Between Pay Checks	a	a	b	a
Keep Extras on Hand for Emergencies	a	c	a	b
Is Installment Buying Good Management?	a	a	c	c
Household Purchases on Installment Plan	a	a	a	a
Plan to Buy at Sales	c	-	c	-
Types of Insurance Carried	-	a	-	a
General Planning Index	a	a	a	a

a. Significant at .01 level.

b. Significant at .05 level.

c. Not significant at .05 level.

ANNOTATIONS

STERILIZATION IN NORTH CAROLINA¹

IN THE Foreword to this book, Dr. R. L. Dickinson says: "This study represents the most inclusive, practical, and important consideration of sterilization since the active days of the Gosney-Popenoe Human Betterment reports from California." North Carolina has had extensive experience in this field since the enactment of its present law in 1933 and the review of the experience provided by the author should be highly valuable to individuals and groups in other States with less well advanced programs.

The background that the author brings to the analysis—that of psychiatric social work—appears responsible for some of the strengths and some of the weaknesses of the study. Also, the nature of the problem dealt with imposed severe limitations on the design of the field research involving the follow-up study of forty-eight married sterilized women. These evaluations will be illustrated after a brief summary of the content of the book.

The book contains an interesting and careful account of the history of sterilization in North Carolina, the background, the laws, the allocation of responsibilities, the actual program, the difficulties impeding wider acceptance, and recommendations for improvement of the program. This account was based on central sources, interviews with individuals or agencies having responsibilities for various parts of the program, and consultation with various informed people including members of the medical profession. Also included in the book is a 35-page chapter entitled, "A Follow Up Study of Forty-eight Married Sterilized Women," with very interesting illustrative case ma-

¹ Woodside, Moya: *STERILIZATION IN NORTH CAROLINA; A SOCIOLOGICAL AND PSYCHOLOGICAL STUDY*. Chapel Hill, The University of North Carolina Press, 1950, 219 pages. \$2.50.

terials. The main weakness in the integration of these two parts of the study is that they do not relate to the same groups of sterilized persons. The records of persons sterilized by the Eugenics Board authority are protected from public inspection and so the follow-up study is of women who had been sterilized by private physicians or through other avenues than that provided by the law, which is the focus of attention of the major part of the book.

In both parts of the book there are instances of uncritical acceptance of certain generalizations made by the author or cited from other works. These appear to arise more from lack of rigorous training and experience in research method and evaluation of research than from deliberate purposeful bias of the author. For example, the description of North Carolina on p. xiv of the Introduction is oversimplified, to say the least, and includes sentences that could be challenged. Citations relating to the extent of mental deficiency (p. 6) are not appraised in relation to the validity of the statistics underlying them. Statements on such matters as the role of heredity in intelligence (p. 102) and the effect of contraception on quality of population (p. 104) are generally accompanied by references to earlier studies, but they are not accompanied by any critical appraisal of the studies or by references to later studies that throw grave doubt on some of the generalizations rather naively accepted by the author as proven beyond the shadow of a doubt.

In fairness, Miss Woodside's book should be appraised from two points of view. As a descriptive analysis of a program that has practical importance but that in recent years has had relatively little attention, the book is to be commended. As an example of social research, it has serious defects.

MARGARET JARMAN HAGOOD

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HUMAN ECOLOGY¹

MUCH of the credit for the development of the ecological approach to the study of social problems belongs to the

¹ Hawley, Amos H.: *HUMAN ECOLOGY*. New York, The Ronald Press, 1950, 466 pp., \$5.00.

late Professor R. D. McKenzie of the University of Chicago. Perhaps to many sociologists the very word ecology immediately brings to mind the many maps prepared by McKenzie and his colleagues and students depicting the spatial distribution of juvenile delinquency, crime, etc. in Chicago during the 'twenties and 'thirties. Before his death in 1940, McKenzie had started work on a comprehensive treatment of human ecology. The task of carrying this work to completion fell to his former student, Amos H. Hawley, now of the University of Michigan. The book under consideration, *HUMAN ECOLOGY*, is the result of this arrangement.

The term "ecology" is one of many that sociologists have borrowed from the field of biology. The great field naturalist, Ernst Haeckel, is credited with coining the term in 1868 in connection with his studies of plants. First and most fully developed in the field of botany, the "ecological approach" was next applied in the field of zoology and still later in the social sciences.

It is erroneous to infer, as did some of the early critics of McKenzie, that human ecology is simply the study of spatial distribution of people or social phenomena. According to Hawley, human ecology "fastens its attention upon the human interdependencies that develop in the action and reaction of a population to its habitat." The subtitle of his book "*A Theory of Community Structure*," indicates the scope of the field as visualized by the author.

Hawley's book is divided into four parts. In Part I, "Ecology and Human Ecology," the author discusses the historical development of plant, animal, and human ecology and suggests "communal adaptation" as the central subject matter of these three branches of ecology. He states that scientific ecology "is indebted to Darwin for the main outlines of its theory, the essential conceptions being: (1) the web of life in which organisms are adjusted or are seeking adjustment to one another, (2) the adjustment process as a struggle for existence, and (3) the environment comprising a highly complex set of conditions of adjustment." (pp. 5-6)

Part II, "The Human Aggregate," is essentially a section on demography. It contains chapters on habitat and population,

population growth, composition of population, and population balance. Although the reviewer read this section with some special interest, he had the feeling that it had not been integrated very well with ecological theory. Part III, "Ecological Organization," contains the core of the author's theory. It consists of chapters on differentiation and organization, community structure, and spatial and temporal aspects of ecological organization. The final section, Part IV, is entitled "Change and Development." It includes a chapter on mobility and change and three chapters on "expansion" related, respectively, to inter-regional organization, the growth of the city, and the local community.

Only a cursory examination of this book is sufficient to indicate the time-consuming work involved in its preparation. The book has all the earmarks of a careful and scholarly work. Its wide scope, its systematic treatment, and its copious citation to other works give it the qualifications of a good textbook and an indispensable reference book in this field.

The study of the nature and development of community structure is an important purpose of the book. However, to this reviewer, the author's treatment of community structure was somewhat disappointing. According to Hawley, "the collective life of man, as of all other organisms, revolves simultaneously about two axes, one of which is symbiotic, the other commensalistic. The former pertains to interdependence of unlike forms, i.e., units of dissimilar functions; the latter to the co-action of like forms, i.e., units of similar functions. . . . Each represents a peculiar and complementary integrative force and together, therefore, they constitute the basis of community cohesion. The community is thus a symbiotic-commensalistic phenomenon." (p. 209)²

Hawley amplifies this theory with the statement that "two distinguishable forms of groupings develop from the two relationships. The symbiotic relation is the basis of what may be called a *corporate* group. Such a group is internally differenti-

² The above in effect represents a bringing together of Herbert Spencer's and Auguste Comte's theories of social unity. As Hawley explains, Spencer held that division of labor and the consequent need for integration are the bases of social unity. Comte emphasized that the essential factor in social unity is "consensus" or similarity of traditions, beliefs, etc.

ated and symbiotically integrated. . . . The commensalistic relation gives rise to a *categoric* group, an association of functionally homogeneous individuals." (pp. 209-210) Functionally, the "corporate" group is a producing unit whereas the role of the "categoric" group "is to conserve or protect what is necessary to the welfare of its members." The author finds a ready example of the *corporate* group in the business enterprise and a good illustration of the *categoric* group in the labor union. These examples also illustrate the author's statement that "the two types of groups are [not] mutually exclusive; rather they interpenetrate one another at numerous points . . . Hence every individual may be thought of as standing at one or more intersections of the symbiotic and commensalistic axes. Every role he occupies in a corporate group qualifies him for membership in an appropriate categoric unit." (p. 210)

Further elaboration of the theory includes a description of three forms of corporate groups: familial, associational, and territorial. These are illustrated, respectively, by the family, the business enterprise, and the city. There are many forms of categoric groups. "Although categoric units based on occupation are the most stable and significant units of that type in the community structure, . . . any characteristic shared by two or more persons, however minute or tenuous it may be, is a potential basis for a commensalistic or categoric grouping. Cliques, clubs, 'societies', neighborhood associations, and the like, are all representative of the categoric reaction." (p. 218)

In his effort to develop a theory of community structure in terms of the corporate-categoric dichotomy, the author is apparently puzzled at various points. He states that "while it is possible to distinguish corporate and categoric units, both symbiotic and commensalistic relations are or tend to be present in every human grouping." (p. 219) After giving several illustrations of this he further states:

In the light of these observations, the definitions of corporate and categoric units require some modification. The corporate unit is a grouping the relations in which are primarily rather than exclusively symbiotic. And the categoric unit is a grouping the internal relations of which are basically though not ex-

clusively commensalistic. It may be that what we have described as units are more appropriately viewed as patterns of relationships which develop to implement their respective functions. Thus an aggregate seeking to engage in a producing activity assumes a corporate form. The same aggregate, however, may find it necessary to perform a conserving function, in which case it takes on a categoric form. This is clearly a matter that is in need of further investigation. (pp. 219-220)

Of chief importance in the above passage is the recognition that the system developed is not water-tight. The suggestion that the "units" (elsewhere also called "groups" and "groupings") might more appropriately be viewed as patterns of relationship seems reasonable to the reviewer. Nevertheless, he had the feeling that "this is where we came in" because the corporate and categoric units were themselves previously described as groupings developed from symbiotic and commensalistic *relationships*, respectively. He was also reminded of the hen and egg riddle. The original postulates were that the symbiotic relation "is the basis of what may be called a corporate group" and the "commensalistic relation gives rise to a categoric group." The later suggestion is that possibly the units are "more appropriately viewed as patterns of relationships *which develop to implement their respective functions.*" (Italics reviewer's.)

In justice to the author it should be emphasized that in the preface he states that "the final answer to the ecological problem is not achieved here" and that "the reader will do well to regard this as a book of hypotheses, as a point of departure for research and subsequent theoretical development." In view of this and in view of the author's disarming candor throughout the book, the reviewer feels somewhat apologetic for pointing out inadequacies and inconsistencies. He ventures the suggestion, however, that much lost motion might be avoided in the development of theory of human ecology if the hypotheses stem from actual community studies rather than from Comte and Spencer. This reviewer, at least, gets a better notion of community structure, and of what makes a community tick, from a study like MIDDLETOWN than from the description of

corporate and categoric units. Other sections of Hawley's book, which are admirably done, suggest that sufficient data have been collected for the formulation of hypotheses on community structure and theory of human ecology.

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